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SELECTED PAPERS.

Observations on the Nature und Preparation of the Elaterium.

Read at the Medical Society of London, April 24, 1819.
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THE subject of the following observations is, with the exception of arsenic, perhaps, and the *Hydro-cyanic* or *Prussic* acid, lately introduced into practice, the most active in the catalogue of the Materia Medica. It is also, according to my experience, one of the most useful, and applicable to many more purposes than is generally understood. I know of no medicine, indeed, from which I have derived greater benefit on various occasions, nor one in which greater confidence may be placed. Whatever can be accomplished in the cure of diseases by active purging, may be effected, certainly, by this medicine. It is not, however, my object to point out its particular uses in the treatment of diseases; these will probably make the subject of a future communication to the society; my present intention is to make some observations regarding its preparation and doses,—points, as it appears to me, that are by no means generally or sufficiently understood. The high price of the article in the shops, leads to great and frequent adulterations, by which the practitioner is often disappointed in the effect expected from it; while, from the same cause, there is great uncertainty in regulating the dose; a circumstance not without danger: for, when

over-dosed, it is capable of producing the most violent, if not fatal, effects; especially when employed in the debilitated habits of dropsical subjects, as is frequently the case.

The only sufficient preventive of adulteration, is a reduction of price, as far as is consistent with the goodness of the article; and it appeared to me an object of some importance to inquire, whether, by any change in the mode of preparation, such a reduction could be effected? This, it is clear, could only be expected from a previous determination of the *seat* of the active principle in the plant, as preparatory to the best mode of *extracting* it. With this view, I submitted to separate examination the various parts of the plant,—the root, leaves, and stalks, as well as the flowers and fruit; and I think have obtained in a great measure the object which I was in search of. Before observing upon what had been already done on the subject, I shall briefly relate the result of my own trials.

Several of the entire plants, with the fruit or cucumbers in a state of maturity, being procured, I submitted each part in turn to trial, in order to ascertain its effects.

1. *The Root.*

The *root* being carefully dried and reduced to powder, five grains of this were exhibited to thirteen adult individuals, of different ages, and labouring under different diseases. This quantity produced no sensible effect. The dose was afterwards increased to ten grains, but equally without effect. I then gave twenty grains in nine cases; in four of which it produced no effect—one, a boy, of fourteen, it purged four or five times. The others were purged in a somewhat less degree.

As my object was not so much to inquire into the relative powers of the different parts of the plant, as whether they could be substituted in small quantities for the elaterium itself, the subject was not pursued further in this direction.

2. *The Leaves.*

The leaves were carefully dried and reduced to powder. After exhibiting several smaller doses without effect, I gave ten grains to as many different individuals, and the result was as follows:—

In *five* of the cases, no effect was produced.

In *two*, the medicine occasioned five or six stools.

In *two* others, only one.

And in *one* instance it produced no effect till the following day, when the patient was purged violently several times.

3. *The Stalks.*

When these were exhibited free from the leaves, and in similar doses, no decided effect followed.

4. *The expressed Juice of the Leaves reduced to the consistence of an Extract.*

This was exhibited in different doses from four to twelve grains, but it had no effect. An extract was made from a decoction of the leaves, but this also, as might be expected, was inert.

5. *The Petals, or Blossoms.*

These appeared to be altogether inert.

It was pretty evident from these trials, that no adequate substitute for the elaterium could be found in the plant, exclusive of the fruit; and therefore I proceeded to examine the different parts of this.

It is hardly necessary to observe, that the fruit of the wild cucumber resembles, in its appearance and structure, the common garden cucumber, differing from it merely in point of size. When full-grown, it is from an inch to an inch and a half in length, and of proportionate thickness. The seeds, which when fully ripe are of a *black* colour, are lodged in a light green pulp, the interstices of which contain from half a drachm to a drachm of nearly limpid fluid. When the cucumber is in a state of maturity, it contracts with great force upon its contents, forces open the extremity, and suddenly scatters the seeds and juice about, to the distance often of several yards. Hence the name of the *squirting cucumber*. When the time is near at hand for discharging its contents, the slightest touch will often produce the effect; and when a quantity of the cucumbers, in a nearly ripened state, are carried to a distance in order to subject them to pressure for procuring the elaterium, a great number are sure to burst on the way, more or fewer, according to the degree of ripeness, and the contained juice is consequently lost.

In order to discover in which of the parts above mentioned the elaterium, or active principle resides, I separated them carefully from each other for trial. For this purpose I slit open the cucumbers longitudinally, and allowed the clear juice to percolate through a fine sieve. The seeds and pulp were then scooped out from the interior of the cucumber, and allowed to drain through the sieve. They were afterwards washed in cold water, separated, and dried. Thus there were *four* different parts for examination; the parenchyma, or body of the cucumber; the seeds; the light pulp surrounding these; and the clear juice lodged in the centre of the fruit.

The part first examined was the parenchyma, or body of the cucumber, after the interior parts, the seeds, pulp, and juice, had been removed. The expressed juice of this part was reduced to the form of extract. Of this two grains were given in *ten* different instances; in *eight* of them, no effect followed. *One* was vomited and purged briskly, and had headach. *Another* was purged several times on the following day.

Eight grains of the same extract were then given in four cases. In two only it produced sickness and purging.

2. A quantity of the bodies of the cucumbers, freed from the juice and seeds as before, was dried and powdered. This powder was exhibited in different doses, from five to ten grains each—it produced no effect, except in one of ten instances, and this was equivocal.

3. The *seeds*, after washing in cold water, were dried and powdered. *Twenty* grains of these produced no effect; this might have been expected, indeed, for mice are observed to eat the seeds greedily.

4. The light pulp immediately surrounding the seeds was washed in cold water, and then dried. It assumed a *gummy* appearance. This likewise was inert, in doses of two and three grains.

It appears sufficiently from these trials, that the most active principle belonging to this plant, is neither lodged in the *roots*, *leaves*, flowers, nor stalks, in any considerable quantity; nor is it to be found in the *body* of the fruit itself, or in the seeds contained within it; it was only in the juice around the seeds,

therefore, that it could be looked for; and here it will be found, as is evident from the following trials.

This juice, as it first issues, without pressure, appears perfectly limpid, and colourless. After it has stood for a short time, it becomes turbid; and after some hours it slowly deposits a sediment, which, being collected and gently dried, without much exposure to light, is of a yellowish white colour, slightly tinged with *green*. When dried, it is very light and pulverulent. This is the real *elaterium*, and it is extremely active as a medicine; an *eighth* part of a grain seldom failing to purge violently, and often with vomiting previously. The quantity contained in the cucumber is exceedingly small. From forty cucumbers I obtained only six grains; so that a single cucumber contains about an ordinary dose. Half a bushel, charged at half a guinea in the market, furnished less than two drachms of elaterium; hence we cannot wonder at the high price it bears in the shops. This, however, is unnecessarily enhanced by the mode of preparation, and its not being known distinctly in what part the active principle is lodged.

The juice, after the elaterium had subsided, was evaporated to an extract. Two grains of this were givin in *six* cases. In *two* of them it produced several stools; one was vomited, and was purged on the following day; *one* was vomited in half an hour without purging; and in *two* it appeared to produce no effect.

I gave five grains of a similar preparation, obtained from Apothecaries' Hall, in *fourteen* instances. In *seven* of them it produced no effect; in *three* it appeared to operate gently by stool. Of the others there was no report.

It appears from hence, that the juice, after the fecula, or *elaterium* has subsided, contains but very little of the active principle; and *that*, probably, from the fecula having imperfectly subsided.

With regard to the *sensible* and *chemical* properties of the fecula, which subsides spontaneously from the juice contained within the cucumber, as above described, and which alone appears to be the true elaterium, I have already observed, that it is a light, pulverulent substance, of a very pale green colour, approaching to yellowish white. To the *taste* it is acrid and

bitterish. The juice itself, as it escapes from the cucumber, readily inflames the skin of the fingers; and on getting accidentally into the eye in one instance, it occasioned severe pain and inflammation, with an erysipelatous swelling of the eyelids, that continued till the following day. The fecula, in the dose of one-eighth of a grain, seldom failed to produce both vomiting and purging, and that often violently. Half this quantity, viz. one-sixteenth of a grain, generally excited considerable purging. From several trials I have made, it appears to operate in little more than half the dose of that obtained from Apothecaries' Hall; which, however, is far more efficacious than what is generally sold in the shops, the quality of which varies extremely. *Some* specimens have acted very well in half grain doses; *others* have produced no effect in the dose of two grains. These are either improperly prepared, or are greatly adulterated. The best and most active I have seen, was some which I obtained from Mr. Parrott, of Mitcham, who for several years raised the plant in his own garden, and prepared the elaterium in large quantity for the Apothecaries' Company.

Much of this medicine, as it is ordinarily met with in the shops, is of a dark green colour, approaching to black: it is likewise compact and heavy, and breaks with a shining resinous fracture. This is usually prepared by strong pressure of the cucumber; and consists, of course, in great part, of the ordinary juices, as well as the elaterium. It is very uncertain in its operation, and very weak, in comparison with that which has been properly prepared. The quantity is much increased by this mode of preparation; and hence it is sold at a much lower rate. The difference in price of this drug is extreme; the Apothecaries' Company charging sometimes as much as twelve shillings a drachm, while it is sold at Corbyn's and some other shops, at *four* shillings. The quality, indeed, is superior at the Hall; but in no degree proportioned to the price. Yet I do not believe that either obtains an exorbitant profit; the difference arising chiefly from the mode of preparation, which, by the Apothecaries' Company, who adhere rigidly to the directions of the Pharmacopœia, is extremely wasteful, as I have satisfied myself by inspection.

With respect to the *chemical* properties of this substance, I shall enter no further into these, than is connected with the purposes of pharmacy.

Water, whether *hot* or *cold*, appears to have no action on pure elaterium. An infusion of eight grains, when filtered, produced no effect. Its insolubility in water, indeed, might be inferred from its spontaneous subsidence in the fluid; yet it is said, by Dr. Woodville, in his "Medical Botany," to be soluble both in spirit and in water. What it is that keeps the elaterium in a state of solution in the juice as first discharged, I have not ascertained.

The *elaterium* procured from the spontaneous subsidence of the juice, without expression, and which may be considered as in a state of purity, dissolves almost entirely in alcohol. Of the best specimens from the Hall, spirit dissolves more than a half; while of inferior sorts, a *fourth* part is thus dissolved. The residue, after repeated affusions of spirit, is quite inert as a medicine. The active principle therefore may be considered as of a *resinous* nature; by which I only mean, however, that it is soluble in alcohol, which it tinges of a pale green colour. When the spirit is slowly evaporated, a resinous looking extract is obtained, which is very inflammable, and which is extremely active as a medicine; the *sixteenth* part of a grain generally producing considerable purging, and often vomiting. When the dose was increased to one-fourth of a grain the effect was more considerable, and often took place in a very few minutes.

History of the Elaterium.

According to Dr. Parr*, the term elaterium was often used by Hippocrates to denote internal applications of a detergent or digestive nature. It has also been applied to any purgative that acts with violence. As applied to the wild cucumber, this substance appears to have been in use at a very early period, though subsequently in a great measure laid aside; of late years it has been restored to use: but in a limited degree, and by no means in proportion to its utility. It was at first employed as a *cathartic* merely; but in later times as a remedy for dropsy.

* "Medical Dictionary," article *Elaterium*.

Simon Pauli says, that from the extreme violence of its operation, it should not be used till milder means have failed. *Lister** and *Hoffman* both assert, that it produces often great heat and pulsation at the very extremities of the fingers. Others say, that it affects the head; which I have often observed to be the case. Dr. Cullen seems hardly to have used it at all; for he says, in his *Materia Medica*, Vol. II. page 544, that he had never known it employed by itself, and only as added, in a grain or two, to other purgatives. He adds, that if Lister's observation of its *heating* the body is well founded, he should not think of employing it at all. The *elaterium* was also occasionally employed as an errhine.

The wild cucumber plant has several synonimes; as *cucumis agrestis; sylvestris;* and *asininas*. The Linnæan name, which our college employs, is *momordica elaterium*. The preparation from this, which we use under the name of *elaterium*, is, in the late editions of the Pharmacopœia, called an *extract*, but with no propriety; for it is not prepared in the manner of other extracts, nor is it at all the same with *extract*, chemically speaking, for this implies solubility in water, which the *elaterium* does not possess. It is likewise often called a *fœcula*, a name applied to *starch*; but as starch is soluble in hot water, it has no analogy with elaterium. From the observations above made, it evidently approaches to the nature of a *resin*.

Lewis, in his *Materia Medica*, page 262, says, all the parts of the plants are strongly purgative: this opinion he appears to have borrowed from Geoffroy, who says, as quoted by Woodville, "*radicum* vis cathartica major est quam *foliorum*; minor vero quam *fructuum*." *Lewis* observes further, that in Holland an extract from the root in wine is exhibited for the elaterium, and found equally efficacious. The trials which I have made, and which are described above, show that the different parts of the plant, and even the fruit itself, with the exception of the contained juice, possess very little of a purgative property, and are not at all adequate substitutes for the *elaterium*. The cucumber altogether, dried and powdered, is said,

* In Appendix to Opera Mortoni, page 25.

by Bouldue,* to be a good hydragogue: this is probable; but from what is stated above, the dose must be large.

The wild cucumber plant is an annual, and a native of the southern parts of Europe. It is very easily cultivated in common garden ground in this country, and in favourable seasons is very productive. Those practitioners who have the opportunity, would do well to raise it themselves, as the preparation of the elaterium is sufficiently easy.

Mention is made, by Berguis, of *two* kinds of elaterium, the *white* and the *black*. The *white* is prepared from the juice that flows without pressure from the fruit simply cut open. The juice is suffered to form a deposit, which is dried by the heat of the sun. It seems to be the precise substance which I have described above. *Berguis* says it is dissolved by digestion in water, but this appears to be a mistake.

The *black* elaterium is prepared from the expressed juice of the cucumber altogether, and of course contains a great deal of extractive and colouring matter along with the real elaterium. This black preparation, instead of being light and pulverulent, is said to be heavy and glutinous when masticated, and sticks to the teeth; it is irritating to the fauces. It dissolves in considerable proportion in *water*, but only partially in *spirit*. It is also deliquescent in some degree. The white is more *resinous*, the black *gummy*, in its properties.

The mode of preparing the elaterium in different pharmacopœias is far from uniform, and the medicine varies accordingly, independent of adulteration. According as more or less *pressure* is used, the medicine will approach to the *black* or *white* species, described above. It appears, from the account I have given, that pressure is not at all necessary in order to obtain the elaterium, and can only serve to deteriorate its quality, and to render the dose uncertain. It is in this way that I account for the large doses prescribed by some writers, without any caution. Sydenham recommends two grain doses without reserve; and Woodville extends the dose from half a grain to three grains. These quantities, where the medicine is in the most active form, would, I think, be often attended with danger.

* Hist. de l'Academie Royale des Sciences de Paris, 1719, p. 46.

The method recommended by the London College, and which is strictly followed at Apothecaries' Hall, is the least objectionable, as it directs only the slightest pressure to be made use of. It is, however, liable to objections in other respects, from it not having been known that the elaterium resides *exclusively* in the juice lodged in the hollow of the cucumber. Hence this has been often wasted and lost. Another source of waste, and that to great amount, is the bursting of many of the cucumbers during their removal from the country.

I have obtained the greatest quantity of the medicine by pursuing the following method:—

The cucumbers should be gathered when as nearly ripe as possible, and without violence, that might endanger their bursting*. They should then be wetted by the affusion of cold water, that less of the juice when they are cut may adhere to the external surface. In this state they should be cut through longitudinally, and the juice allowed to strain through a fine sieve, placed in a large earthernware vessel. The seeds and surrounding pulp should be scooped out upon the sieve, and washed with repeated affusions of cold water, by which they will be freed from all adhering juice. Something will be saved also by afterwards rincing the split cucumbers themselves in cold water, from which a portion of elaterium may be collected.

After standing a few hours, a sediment is formed from which the clear liquor is to be poured off; it is then to be thinly spread on fine linen, and exposed to the air to dry: a gentle warmth may be employed without injury; but the access of sunshine destroys the fine green colour which the substance otherwise acquires.

* The Dublin College direct them to be gathered before they are ripe; by this means, the chance of bursting is avoided; but it is a question whether the medicine is equally active as at a later period.

Description of an Acid Principle prepared from the Lithic or Uric Acid. By WILLIAM PROUT, M. D. *Communicated by* W. H. WOLLASTON, M. D. F. R. S.*

[From the Philosophical Magazine for January, 1819.]

DURING an investigation of the principles of the urine, with the view of elucidating the pathology of that secretion, I was led to examine the well known beautiful purple substance produced by the action of the nitric acid and heat upon the lithic acid, and which has usually been considered as one of the characteristic distinctions of the lithic acid. This purple substance proved to be a compound of ammonia, and a peculiar principle having the properties of an acid;—the description of which, and of its compounds, constitutes the object of the present paper.

This acid principle may be obtained by digesting pure lithic acid in dilute nitric acid: an effervescence takes place, and the lithic acid is dissolved. The excess of nitric acid is then to be neutralized with ammonia, and the whole slowly concentrated by evaporation. As the evaporation proceeds, the colour of the solution gradually becomes of a deeper purple, and dark red granular crystals, sometimes of a greenish hue externally, soon begin to separate in abundance. These crystals are a compound of ammonia with the acid principle in question. The ammonia may be removed by the sulphuric or muriatic acid, and thus the acid principle obtained in a separate state. As, however, I found some little care requisite to obtain the acid quite free from colour, it may not be deemed superfluous to state the precise method I usually followed for that purpose. The compound with ammonia, above mentioned, was dissolved in a solution of caustic potash, and heat applied to the solution till the red colour entirely disappeared. This alkaline solution was then gradually dropped into dilute sulphuric acid, which, uniting with the potash, left the acid principle in a state of purity.

The acid principle is likewise produced from lithic acid by chlorine. Iodine has also the same remarkable property,

* From the Transactions of the Royal Society for 1818, Part II.

though in a much less striking degree. When lithic acid is boiled with iodine for some time, a partial solution of the lithic acid is effected; and if to this solution a little ammonia be added, and the whole evaporated to dryness, a perceptible quantity of the beautiful purple compound of ammonia and the new acid principle will be obtained. I am not aware that any other substance is capable of producing this change, though the circumstance is by no means improbable.

To prevent circumlocution, I shall in future call this principle the *purpuric acid*, a name suggested by Dr. Wollaston, from its remarkable property of forming compounds with most bases of a red or purple colour.

The purpuric acid, as obtained above, usually exists in the form of a very fine powder, of a slightly yellowish or cream colour; and when examined with a magnifier, especially in water, appears to possess a pearly lustre. It has no smell nor taste. Its specific gravity is considerably above that of water, though, from the minute state of division in which it exists, it usually takes a considerable time to subside in that fluid. When suffered to separate slowly from a large quantity of water, or any other fluid capable of holding it in solution, it sometimes assumes the form of thin pearly scales.

The purpuric acid is very little soluble in water. One-tenth of a grain boiled for a considerable time in 1000 grains of water, was not entirely dissolved. The water assumed a purple tint, which it retained after it was cold, though it became very slightly turbid on cooling.* The purpuric acid is insoluble in alcohol and ether. In all the mineral acids, when concentrated and in excess, and in solutions of the different alkalies, it dissolves readily; but it is insoluble, or nearly so, in dilute sulphuric, muriatic, and phosphoric acids, and also in solutions of the oxalic, citric, and tartaric acids. Concentrated nitric acid readily dissolves it with effervescence; and if the

* I am not quite sure whether the purple tint here mentioned depends upon the actual solution of a minute portion of the purpuric acid; and, consequently, whether it naturally forms a purple solution, or whether the colour be owing to the formation of a little ammonia from the decomposition of a minute proportion of the acid, which, combining with the remainder of the acid, forms the purpurate of ammonia. I incline to the latter opinion.

acid be in excess, and heat be applied, a portion of the purpuric acid is decomposed, ammonia is formed; and on driving off the excess of nitric acid by heat, the purpurate of ammonia is obtained, precisely as if a little of the lithic acid had been treated in a similar manner. Chlorine, likewise, dissolves the purpuric acid, and apparently produces the same changes upon it as the nitric acid. It readily dissolves also by the assistance of heat, in concentrated acetic acid.

The purpuric acid does not sensibly affect litmus paper, probably on account of its insoluble nature. When exposed to the air it does not deliquesce, but gradually assumes a purplish tint, apparently by attracting a little ammonia from the atmosphere, or perhaps from the evolution from itself of a little of the same alkali by spontaneous decomposition.

Submitted to heat, it neither melts nor sublimes, but acquires a purple hue from the formation of ammonia, and afterwards burns gradually, without yielding any remarkable odour. Subjected alone to heat in close vessels, it yields a considerable proportion of the carbonate of ammonia, some prussic acid, and a little fluid having an oily appearance; while a portion of pulverulent charcoal remains. When given quantities were burnt with the oxide of copper, in the manner formerly described by me,* data were obtained, which appeared to show that one hundred parts consist of

Hydrogen	4.54	corresponding with 2 atoms or proportions.
Carbon	27.27	2 ditto
Oxygen	36.36	2 ditto
Azote	31.81	1 ditto

The purpuric acid combines with the alkalies, alkaline earths, and metallic oxides. It is capable of expelling the carbonic acid from the alkaline carbonates, by the assistance of heat, and does not, as far as I have observed, combine with any other acid. These are circumstances sufficient, as Dr. Wollaston has observed, to distinguish it from an *oxide*, and to establish its character as an *acid*. On the supposition then, that it be named the *purpuric acid*, its compounds with different bases must be denominated *purpurates:* on some of the

* See Medico-Chirurgical Transactions, vol. viii. p. 526.

most remarkable of which I shall now proceed to make a few remarks.

Purpurate of ammonia. This salt crystallizes in quadrangular prisms, which, when viewed by transmitted light, are transparent, and of a deep garnet red colour; but by reflected light, their two broadest opposite faces appear of a brilliant green, closely resembling that of the wings of some of the beetle tribe, as for example, of the *Cetonia aurata*, while their other two opposite faces appear of a dull reddish brown colour; or, if the light be very strong, slightly green. This peculiarity seems to be possessed in a greater or less degree by all the other alkaline, and perhaps earthy salts; and doubtless depends upon the structure of the crystals. The purpurate of ammonia is soluble in about 1500 parts of water at 60°, but in boiling water is much more soluble. The solution is of a beautiful deep carmine, or rose red colour. In pure alcohol and in ether, it is little if at all soluble. The aqueous solution has a slightly sweetish taste, but no smell. By adding this aqueous solution of the purpurate of ammonia to neutral saline solutions of other bases, most of the following purpurates were formed.

Purpurate of potash. When a saturated boiling solution of the purpurate of ammonia is added to a solution of the bi-carbonate of potash, a dark brownish red precipitate takes place, which is the purpurate of potash. If, however, this salt be slowly formed, it may be obtained in a crystalline form; and the crystals appear to possess the same peculiarity with respect to colour, as those of the purpurate of ammonia above mentioned. This salt is much more soluble than the purpurate of ammonia.

Purpurate of soda. This salt, when obtained by the same means as the purpurate of potash, is of a dark brick red colour. It may, however, be obtained in crystals. It is much less soluble than the purpurate of potash. Three thousand times its weight of water at 60° did not completely dissolve it. The colours of the solutions of this salt, and of potash, differ slightly from one another, and also from that of the purpurate of ammonia; but it is not easy to describe these differences so as to render them intelligible.

Purpurate of lime. This salt, when obtained by adding a boiling saturated solution of the purpurate of ammonia to a solution of the muriate of lime, exists in the form of a powder much resembling in colour the crust of the lobster before it is boiled. This salt is but little soluble in cold water; but in boiling water it is more soluble, and the solution is of a beautiful reddish purple colour.

Purpurate of strontian. This salt obtained as above, with the nitrate of strontian, exists in the state of a dark brownish red powder, with a slight tinge of green. It seems to be more soluble than the purpurate of lime, and forms a purple solution.

Purpurate of barytes. Obtained as before described, with the acetate of barytes, this salt assumes the form of a dark green powder, not apparently differing much in point of solubility from the purpurate of strontian; and forming, like that salt, a purple solution.

Purpurate of magnesia. This is a very soluble salt. Its solution is of a beautiful purple.

Purpurate of alumina. When a solution of the purpurate of ammonia was added to a solution of alum, no perceptible change took place immediately; but after some time the colour of the solution disappeared, and a small quantity of a white substance separated, which was presumed to be the purpurate of alumina, but it was not examined.

Purpurate of gold. When a solution of the muriate of gold is dropped into a solution of the purpurate of ammonia, the colour becomes yellowish, but no precipitation takes place. Hence, this salt may be presumed to be very soluble.

Purpurate of platina. The muriate of platina changes the colour of the purpurate of ammonia to a yellowish scarlet, but produces no precipitation.

Purpurate of silver. Solutions of the acetate or nitrate of silver, dropped into a solution of the purpurate of ammonia, produce a deep purple precipitate; and the water is left nearly colourless. Hence the purpurate of silver appears very insoluble.

Purpurate of mercury. A solution of the proto-nitrate of mercury produces, with the purpurate of ammonia, a beautiful

reddish purple precipitate, and the water is left nearly colourless. A solution of the oxymuriate of mercury produces at first no change; but after some time a copious light rose-coloured precipitate occurs, and the solution is left colourless.

Purpurate of lead. A solution of the nitrate of lead, dropped in a solution of the purpurate of ammonia, renders it of a rose red colour; but no precipitation takes place.

Purpurate of zinc. A solution of the acetate of zinc produces with the purpurate of ammonia a solution and precipitate of a beautiful gold yellow colour; and a most brilliant iridescent pellicle, in which green and yellow predominate, forms on the surface of the solution.

Purpurate of tin. A solution of the muriate of tin changes the purpurate of ammonia to a scarlet; but this rapidly disappears, and the solution becomes colourless. After a few hours, white pearly crystals form in abundance, which is the purpurate of tin.

Purpurate of copper. A solution of the acetate or sulphate of copper changes the purpurate of ammonia to a bright yellowish green colour, but produces no precipitation.

Purpurate of nickel. The nitrate of nickel imparts to the purpurate of ammonia a greenish tinge, but produces no precipitation.

Purpurate of cobalt. The acetate of cobalt changes the colour of the same salt to a pale scarlet. After some time, reddish granular crystals form, which are the purpurate of cobalt.

Purpurate of iron. A solution of the green sulphate of iron changes the colour of the purpurate of ammonia to yellowish red, but produces no precipitate.

Such is a very brief account of the *purpurates*, as far as I have examined them. It may at first sight appear singular, that such an insoluble acid should form so many soluble compounds; but when we reflect upon the subject, and consider what a very small quantity of the purpurate of ammonia is retained in solution by water, and that this small quantity has been made the standard of comparison in the above experiments, our surprise is considerably lessened, and we feel no difficulty in conceiving, that if the purpurates were compared

with the nitrates, for example, the former would be found by far the least soluble.

From the very small quantities on which I have been obliged to operate, and from other circumstances, I can offer but little respecting the constitution of the purpurates. Those which I have attempted to analyse appear to be anhydrous, and to be composed of two atoms of the acid, and one of the base; and if this be correct, the same composition may perhaps be referred to most, if not all the compounds above mentioned. The purpuric acid, however, appears capable of forming subsalts and supersalts, with most bases, many of which seem to be very little soluble.

With respect to the characteristic properties of the purpuric acid, I apprehend it may be readily distinguished from all other substances by the beautiful colours exhibited by its alkaline and earthy salts, independently of its other properties, which are likewise peculiar.

The purpuric acid and its compounds probably constitute the basis of many animal and vegetable colours. The well known pink sediment, which generally appears in the urine of those labouring under febrile affections, appears to owe its colour chiefly to the purpurate of ammonia, and perhaps occasionally to the purpurate of soda. Some of the purpurates, as for example that of lime, might be probably used as a paint. They might be also used for dyeing, especially wool and other animal productions.* On this part of the subject, however, as I have little that is certain to offer, I do not deem it prudent to enter at present.

*I may here observe, that the solution of lithic acid in nitric acid has the property of tingeing the skin and other animal substances in a very permanent manner. The colour does not, in general, appear till the substance has been exposed to heat, or, what is more effective, to the light of the sun. In the latter case, particularly, a deep purple tint soon makes its appearance, and the substance tinged (more especially the skin) emits during the process a strong and peculiar smell, closely resembling that produced by the nitrate of silver, when applied to the skin, and exposed to similar circumstances.

On the Euphorbia Corollata.

[From the Baltimore Federal Republican, of November, 1819.]

It is with pleasure that I now present the medical profession, with the history and medical virtues of a plant that has long since been noticed by writers on botany as belonging to the class Dodecandria and order Trigynia and the natural order Tricoccæ; though its medical properties have never as yet been mentioned by any writer on Materia Medica.

Euphorbia Corollata.—This plant, which is exclusively a native of the United States, is known by a variety of appellations, such as milk-weed, snakes' milk, ipecacuanha, Indian physic, &c. The country people tell us, that snakes feed upon the milky substance which pours out of every part of the plant from its receiving the slightest wound; and from this circumstance it has received the name of snakes'-milk; but ipecacuanha would appear to be the most appropriate name, inasmuch, as this word, in the language of South America, signifies vomiting root, and is given to every plant that possesses emetic powers to any considerable degree.

This valuable indigenous production may be procured in the State of Maryland, within about ten miles from this city, in any quantity. It grows in the greatest abundance in the dry and sandy soil of Anne Arundel county; it is also to be met with, in almost every other county within the state, but not in such abundance. It is never eaten by animals.—In some parts it is supposed to be a poisonous plant; while in other parts of the country it is used as an emetic in cases of Febris Intermittens and Dropsy, and, it is said, with decided benefit.

Description of the Euphorbia Coroliata.

Root perennial, branching in various directions. Stem erect round and smooth, and more or less of a purple color. Universal umbel five-cleft, primary partial umbel three-cleft, the others dichotomous. Universal involucre five or six leaved, leaflets oblong, obtuse; partial three-leaved, the rest two-leaved. The rays of the primary umbel have a leaflet and a small

dichotomous branch in the middle. Stem leaves lanceolate, very obtuse. Petals, snow white, spread out flat, in fours and fives, not shaped like a petal, but very slender.

MEDICAL VIRTUES.—I have given the powdered root of the Euphorbia Corollata in a number of cases, by way of experiment, in order to satisfy myself of its application as a medicine; and have made use of it in practice for some time past; and I am bold in saying that I believe it to be equal to the cephaelis ipecacuanha .As an emetic, it is mild and certain in its operation, rarely occasioning pain or spasms, and exciting little previous nausea or giddiness; possessing an advantage over some other medicines of this class, that when it does not prove emetic, it passes off by the bowels.

The dose of the powdered root is from fifteen to twenty grains; but it may be given in larger doses, without its being attended with any violent effects. In this respect it possesses an advantage over the euphorbia ipecacuanha. Its activity is very little impaired by boiling. Combined with opium, in the form of the Pulvis Doveri it is a valuable diaphoretic. The watery and alcoholic extracts may be given in the dose of from five to eight grains; they differ very little in the force with which they act. The Vinum Euphorbiæ Corollatæ acts with as much certainty as the Vinum Ipecacuanhæ; the manner of preparing it is as follows:—℞ Radicis Euphorbiæ Corollatæ, unciam j. Vini Hispani Albi, octantem j. The dose is an ounce for a grown person.

CHEMICAL ANALYSIS.—By separating the epidermis and corticle from the ligneous part of 893 grains of the recent root, and weighing them accurately, the result was as follows: Epidermis 84 grains, ligneous or woody part 189, and 620 of cortex, or bark.—So from the above examination, it appears that the root is made up of nearly two thirds of the most active part, which is the bark.

From 2,160 grains of the recent root, I obtained 102 grains of watery extract; and from the same quantity of root, after digesting it a suitable time in alcohol, and filtering, and carefully evaporating it to a proper consistence, I obtained 123 grains of alcoholic extract.

WILLIAM ZOLLICKOFFER, M. D.

On the Language of Complaint during Pain, and the Consequences of suppressing it, principally from the French of Baron Larrey.

[From the Medico-Chirurgical Journal, for July, 1819.]

The life of man, from the instant of his birth till the moment of his dissolution, is one continued struggle against the innumerable dolorific agents that surround and annoy him. The same organs of sense by which he enjoys pleasure, are the media through which pain is also conveyed. That the sense of pain is as wisely implanted in our nerves as the sense of pleasure, there can be little doubt; but our present object is to inquire whether that peculiar language of complaint, which, indeed, is the universal language of all animated nature, has any *salutary* tendency, or is merely the index of our sensations.

The infant cries the moment it enters this world; no doubt from a sense of pain occasioned by the new impression of the atmosphere. It has no other language to make known its pains or uneasiness; but in this view alone, it is a wise gift of the Omnipotent Creator. Were it not for this animated language of Nature, the careless nurse might implant pins into the infant's flesh, or neglect to supply it with sufficient aliment. As nature seldom adapts a single mean to a single purpose, we have every reason to believe that the *moderate action of crying* has a salutary influence on the pulmonary system of the child, and through that on the whole corporeal fabric.

That the language of complaint is useful in *moral* afflictions, we have the most demonstrative evidence. The fact is so striking as to have arrested the attention of the poets as well as the physicians of every age. A flood of *tears* instantly relieves both mind and body! The cheeks of Niobe were dry when grief burst her heart for the loss of her children. The observant physician sees, at every step of his professional rounds, the morbid corporeal effects of *suppressed* mental emotions. This did not escape the penetrating eye of Shakespeare.

——— ——— "She never told her love,
But let Concealment, like a worm i' the bud,
Feed on her damask cheek."

It is in this way that the confidence of a friend, to whom we can unbosom our sorrows, often prevents that *corporeal* derangement in the brain, which ends in insanity or suicide, when the cause of grief is kept locked up in the breast. It is a certain fact, that even *solitude* confers a comparative relief, because we are there, as it were, enabled to give vent to our emotions in sighs, groans, or ejaculations. But when in the midst of company, to whom we dare not communicate our thoughts, we endure the pangs of the damned, and are always eager to get away into the open air by ourselves.

The ravages which grief and other melancholy emotions make upon the function and structure of our corporeal organs, is truly astonishing. They are not much less numerous than those from *physical* causes. And why need we wonder at this, when we have so many well authenticated instances of death itself, on the spot, from mental emotions? Marcellus Donatus relates, that at the siege of Buda, a young soldier fought with such surprising valour, as to excite the admiration of the whole army, both friends and enemies; but who at length fell, overpowered by numbers. It was eagerly inquired who this valiant youth could be; and after the battle, his body being found, and his vizor taken off, Raisciat of Suabia recognized him as his son! The father remained perfectly motionless for a few seconds, his eyes tearless and fixed on the corpse—he then fell over the body, and instantly expired without uttering a groan!

Innumerable instances of the effects of sorrow, though less suddenly fatal, on the functions and structure of the viscera might be here adduced; but we shall only state one or two. Boyle relates that a woman having sat down to rest on the bank of a canal, permitted her infant child to creep about on the grass. The child however fell into the water, and the mother on looking up saw her offspring sinking! She was instantly stricken with palsy of one arm, which continued during life.

But what intelligent or experienced physician has not seen hypochondriasis, mania, epilepsy, result from moral afflictions? It is, however, on the *epigastric centre* that grief and anxiety chiefly vent their morbid effects. Hence it is that

aneurism and other structural derangements of the heart are so frequently developed; and hence too those scirrhous affections of the stomach, especially of the pylorus, which we meet with among people long preyed on by melancholy emotions of the mind.

The hepatic system also comes very particularly under the influence of suppressed sorrow, and strong mental conflicts. We have seen an incredible number of these cases. Renauldin relates the case of a man who, in one minute was suffused completely yellow, from mental agitation, under his own eye. But to return to the language of complaint in painful diseases, and during operations.

The proud stoic will tell you, that as pain is not an evil, to complain is unworthy of a man; and to *cry* is a piece of shameful pusillanimity. But the stoic, instead of being a natural, is a most *unnatural* philosopher! Pain is the lot of human nature; but the language of complaint is permitted to him who suffers. Pain, indeed, very generally tames the proudest and the fiercest mind; like the force of love, it reduces all ranks to a level. When Felix operated on Henry the Fourth, of France, for a *fistula in ano*, the patient at first endeavoured to suppress his feelings, and act the monarch. But the bistoury soon subdued his resolution, and before the operation was over, this prince and hero roared as loud as any of his subjects!

To *moderate* the expression of our feelings in painful diseases, and especially under surgical operations, is commendable; to *suppress* them is dangerous. It is not beneath the dignity of the bravest warrior to wince under the surgeon's knife. Read the Iliad, and your ears will be stunned with the cries of the Grecian and Trojan heroes when wounded. In fact, the *experienced* surgeon will be far from gratified to find his patient utter not a complaint during a painful surgical operation. It is a bad omen, whether it result from insensibility of the patient, or a proud suppression of his feelings. Anne, of Austria, was afflicted with a cancer in the breast, which caused the most excruciating torture at intervals. Her confessor exhorted her to restrain her expressions of sufferings at these times; but in doing so, she experienced such a sense of suffocation and anguish internally, as nearly overwhelmed her.

The Marechal du Muy was operated on for stone in the bladder. He prayed devoutly at mass, just before the operation, for strength of mind to bear the pain; and he so far suppressed the feelings of nature, that he uttered not a murmur while the stone was extracted. He died almost immediately afterwards.

Baron Percy, who has performed as many surgical operations as any man living, remarks, that "it is a favourable circumstance when, under great operations, the patient cries and shed tears. It appears that, in such cases, a kind of general relaxation takes place in the system, rendered previously almost convulsed by the pain. The functions of the heart are deranged; the respiration is impeded; the blood is detained in the large vessels; the nervous system is spasmed; and the motions of the diaphragm are irregular and tumultuous. All these morbid phenomena are greatly exasperated, *if the language of complaint be suppressed;* si le malade se tait et resiste. The impression of anguish cannot be effaced afterwards; the vital powers take a destructive direction; the whole animal economy is perverted; and sudden death, or a low fever, too often ending in the same, is the sad result of this state of things." "L'empreinte de la douleur ne peut plus s'effacer; les propriétés vitales recoivent une direction destructive; L'organisme entier est etrainé dans cette perversion, et une mort prompte, ou une fievre ataxique dont elle est trop souvent la terminaison, est le triste résultat de cet état de choses." "If, on the contrary, the patient cries out; if he exhales; if, as Montagne says, he evaporates the pain, these effects will not take place, and these impressions will be but transitory. "Si le malade crie, s'il exhale, si, comme dit encore Montaigne, il evapore sa douleur, ces effets sont presque nuls, et ces impressions simplement fugitives." Every cry, which consists in a deep inspiration followed by a sudden and interrupted expiration, dilates and distends every part which the pain had previously constricted; thus preventing congestions; facilitating the circulation of the blood through the lungs; disembarrassing the heart: in fine, bringing constantly back that *order*, which pain, the great enemy of order, tends incessantly to subvert.

The Baron remarks, that he has often met with men who, in the midst of the most terrible sufferings, knew not how to, or could not cry out. They appeared as if stupified, or absorbed by the pain, which seemed to reign paramount over every other sentiment and instinct. "I have, says this experienced surgeon, exhorted men, under these circumstances, to cry aloud, when I saw the pain ravaging on their vitals; their necks and chests swell; the hair bristle on their heads; the mouth closed, and distorted; all the muscles contracted; the face pale, and sunk; the eye fixed and projected—the countenance wild; a hollow, stertorous sound issuing from the bottom of the throat; and yet suffering nature giving no vent to her feelings."—This may be termed the *passive* suppression of complaint; for when from false pride, or other motive, men have constrained by violence their feelings, the phenomena wear a different aspect. The face becomes swelled and reddened—the abdomen is flattened and contracted—the hypochondria project—the mouth is open, as if to give passage to cries which are stiffled in the throat—the eyes are red, injected, but not moistened with tears.—The whole body bears the marks of violent efforts to overcome the pain. But even these expressions of the countenance can sometimes be suppressed.

"I extirpated," says Baron Larrey, "the breast of a lady affected with cancer, who was of a most religious turn of mind. She held a crucifix in her hand, smiling and talking to it in the most tranquil and placid manner, during the whole of the operation, while her body was contorted with agony. She was seized immediately afterwards with an universal spasmodic affection, which nearly put an end to her existence." "Another time," says the same distinguished surgeon, "I operated, for a large popliteal aneurism, on the master of a seminary who, though young, and apparently susceptible, bore the operation, which was very painful and complicated, without uttering a word, or moving a single muscle. But a terrible *re-action* succeeded this internal struggle between Nature and pain! Spasms and cramps assailed the suffering patient for the first fifteen days after the operation, and he did not recover under three months."

We trust that the observations contained in the foregoing

paper, may not be unprofitable to the surgical reader. Every thing which can mar in any degree the success of an operation is of great importance to the young surgeon; and we have repeatedly seen much mischief done by the almost universal habit which surgeons are in of repressing the language of complaint in their patients, and exhorting them to bear their sufferings without a murmur. This evil is increased by the *bravado* of the patient, who, in an operation room or public hospital, endeavours to stifle his groans, and act the hero, when it would be much wiser to shew himself the frail mortal, the child of pain, by giving a moderate and natural vent to the LANGUAGE OF COMPLAINT.

Observations on the Utility of Hedera Sylvestris (Ground-Ivy) in the Treatment of Mania. By E. SUTLIFFE, Esq.

[From the London Medical and Physical Journal, for September, 1819.

THE medical qualities of ground-ivy are not, I believe, sufficiently known to the medical profession, for it is not admitted into our Pharmacopœia. I have employed it for more than twenty years in cases of mental aberration, especially in melancholia, with the most advantageous results, and am disposed to think that it is a highly valuable remedy. It appears to act as a direct sedative. When its operation is salutary, it tranquillizes the patient; and when no organic disease is present, and the affection seems to depend on a casual cause of excitement, I am not often disappointed in my expectations of a favourable termination of the malady under its use.

The mode in which I have generally directed it to be employed, is a wine-glass full of the liquid juice twice or thrice a-day, but in some cases this cannot be exhibited; I have then ordered a proportionate quantity of the extract: but my observations have not led me to repose so full a degree of confidence in the latter as in the former preparation of the plant.

In cases of mania, where the high arterial excitement requires *local reduction*, I have found it, conjoined with abstraction of blood, generally to lead the disease to a favourable issue. In some

cases it has, however, not been productive of any benefit: in these, I suspect, there has been present some organic disease.

My object in making the preceding brief observations, is to draw the attention of other practitioners to this remedy, and to extend the benefits that may be derived from it beyond the circle of my own personal avocation.

Queen Street, Cheapside; July 8th, 1819.

From Observations on the Excretion of the Milk. (Œuvres de Bordeu. *Récherches Anatomiques sur les Glandes*, § lxxiii.)

[From the London Medical and Physical Journal, for Aug. and Sept. 1819.]

It is now universally understood, that the excretory ducts of the breast terminate in considerable numbers in the nipple, where they are replicated on each other in such a manner, that, if they are extended or made straight by drawing out the nipple, they permit the milk to pass with increased facility.

It is also known that an infant, in the first instance, merely elongates the nipple by drawing it towards him, and the milk thus flows into his mouth; besides that, he may also, by sucking, draw the milk of the nurse who suckles him: but this is a peculiar species of excretion, on which we shall not here dwell. It has some analogy with the effect of a cupping glass, and does not relate to my present object. Besides which, the mechanism of this is well explained in the *Memoires de l'Académie des Sciences.*

It should be remarked, that an infant, in sucking, besides extending the nipple, irritates or excites it; so that the breast itself enters into contraction, or into a sort of *erection.*

There is no nurse who has not experienced this tension, and a species of *titillation*, which is the consequence of it. They generally say, that they perceive the milk flow into the breast. The breast becomes round, firm, and distended; and there are some women who suffer drawing and tremulous sensations, which extend as far as the shoulders, the loins, and even into

the arms. These sensations are painful in some women; but they ordinarily experience a titillation more or less voluptuous.

These irritations have so much influence on the excretion of the milk, that there are many mothers who cannot suckle any other than their own infant, because they are not excited by others.

The infant has difficulty sometimes in managing every sort of nipple; and nurses find children who do not excite them sufficiently, who do not induce a flow of milk, or who do not cause those *titillations*, or those *tremulous motions*, of which we have just spoken: but there is hardly any one who does not find some infant that suits her, to which she attaches herself the more, because it repays her by exciting sensations to which tenderness succeeds.

One might believe, when an infant sucks, and when he touches the breast, handling it different ways, that he compresses it: the fact is, he elongates it a little, and excites it by friction.

There are some mothers who, when their infant touches them, are titillated to such a degree, that a sort of constriction in their breasts takes place, which prevents the flow of milk. There are some that are less sensible, who say that the contact of the infant produces an impression or modification of sensation in their breasts, which they are unable to describe, and which does not differ from that species of *erection* of which we have already spoken.

It must be acknowledged, that there are some nurses in whom the milk escapes on compressing the breast: it makes a jet, but this jet is not of long duration; it only arises from the evacuation of the largest of the lacteal vessels situate near the nipple; and if the breast does not enter into contraction, the excretion of milk does not continue.

There are also some nurses who lose their milk in this way at certain hours, after taking food: their breasts have passed through all the states of which we have spoken, and the vessels have been so full, that the milk has escaped from a sort of disgorgement; but this only takes place to a certain point, and but little also flows from compression.

It is necessary to observe what passes here with attention;

and, if we take care not to confound extension with compression of the breast, or with the changes which arrive in it by irritation, we shall be convinced that compression only causes the evacuation of part of the milk, which was contained in the largest ducts about the nipple; which are, as it were, little reservoirs, that they may be suddenly evacuated; but from which compression would never excite a continual flow of the fluid, without the causes which we have detailed.

We have seen women who have endeavoured to make their milk flow before the infant had sucked them, and put their breasts into action, but that has been impossible; but, as soon as the breasts had been thrown into contraction, by rubbing them and exciting the nipple, the milk has flowed of itself for a certain time, and could not be checked until the paroxysm subsided. This illustrates what we have stated above; and it is necessary to remark, that excitement of one breast is sometimes sufficient to put them both into action.

There are women who appear to have hardly any milk in their breasts, which are lax and empty; but, as soon as the infant excites them, they become distended, and the milk freely flows.

The history of the changes which take place in women in child-bed, and that of their maladies, demonstrates still better the species of contraction which we believe to be necessary in the breast, in order that the milk may flow from it. It is only necessary to pay attention to all these changes, to be convinced that the milk only appears in the breasts when they have been put into action; and it will be easy to perceive many phenomena which confirm it, that would occupy too much space in their detail.

Similar observations, which every person may readily confirm, and to which many additional peculiarities may be added, indicate the true cause of the excretion of the milk; which depends on a species of convulsive action, that, after having prepared the passages or canals terminating in the nipple, which has itself become tense, seizes the whole body of the breast, and disposes it to render its milk, when it is excited by the infant; which contributes, in its turn, to the excretion of that fluid by the suction it employs, as well as by the excitement of the organ which it produces.

[§ lxxiv.]

Those who have often witnessed the milking of cows, or who have had the curiosity to attempt effecting it themselves, must have perceived, that, as the peasants express it, *every body has not a good hand for it.*

Any rude compression of the teat will not do; it should be gently titillated and elongated; we then see the cow fix herself in her position, extend her thighs a little, and then the milk flows in abundance. If compression or extension of the teat were only necessary, every body could milk an animal.

It often happens that a person who knows very well how to milk cannot get milk from certain cows. Some are delicate in this respect, others are trickish: the former can only give their milk to certain persons; the latter will only do so to those that excite them in a certain manner. They commonly habituate themselves to those who have been accustomed to milk them; and it is often useless for strangers to attempt to effect it.

We sometimes see peasants menace, and even beat, their ewes, cows, and goats, until they choose, as they say, to give their milk; of which they are sometimes very avaricious. Some will only give it when they are amused by having something to eat set before them; others would never give it if their attention were thus distracted: there are in this respect many variations.

What happens with respect to their sucklings, also merits attention. It is known that they seize the teat, and that they elongate it, by pressing it in a sort of canal which they form with their tongue; they suck thus, and labour some time without being able to get any milk, which comes at length when the mother places herself in a certain posture: if she walks about, or if she amuses herself, the suckling does not get much; it is necessary that the mother be occupied by what regards her young one.

When the mother does not give her milk properly, what is it that the young one does? We see it assume a variety of motions; it shakes the teat, and presses it towards the contiguous parts: these agitations make the milk flow, not because

they compress the udder, but because they excite it, and put it into action.

A suckling which displeases its mother, as sometimes happens, or a stranger, that the mother will recognise by the rude efforts he makes, and the irritations he excites, will try in vain; he will not get a drop of milk; the mother preserves it for her favourite.

We have been assured by peasants, that there have been vicious cows, which would neither give any milk to their sucklings, nor to those persons who tried to milk them, and which nevertheless appeared to be well adapted for having milk. On watching them during the night, it has been seen that serpents came and hung by their teats, and sucked them; which the cows suffered with so much pleasure, that they showed their passion by continual lowings. It is a received opinion amongst the Pyrenees, that serpents have the talent of titillating the cows to such a degree, that, when they have been sucked by these animals, they will not suffer either their sucklings or the peasants to milk them.

There are women who assume an affection for certain children; there are also amongst brute animals some mothers who only take pleasure from certain sucklings: this is commonly their own, as we have already observed, or that to which they have been habituated. But some have been seen to form an attachment to young animals, which they would have fled from, or devoured, if they had not been retained by the delight of the titillation they have endured. Bitches, the most eager after game, have been known to suckle rabbits and squirrels, as well as young wild hogs and wolves, which certainly possessed their natural ferocity; since animals of the same species with the mother who nourished them, have fled from them with terror, or pursued them with rage.

There are some young animals, which, not knowing how to suck, disgust their mothers, whom the peasants are obliged to render favourable to them, by accustoming their teats to the sensation which the suckling, not having the talent to flatter the mother, excites; for the mother will only nourish it on the condition that she shall herself have her share of pleasure.

To these remarks we should add, that, with respect to

women, as well as to cows, goats, &c. those who have the largest mammæ are not those who give the most milk. They should be sensible in proportion as they are large, without which they become flabby or loaded with fat: they should also be disposed to enter into contraction, and to take on that action which elicits the milk and causes it to flow.

It must not be forgotten, that, if a mother be not for a certain length of time excited by her suckling, the breasts forget their proper function; they subside, and become indolent, and without action. There are some, however, which can recover it by simple suction; the breasts then awake from their state of drowsiness.

Precocious girls have sometimes been seen, who, having habitually suffered themselves to be sucked, have had milk formed in their breasts; but we know that the breasts commonly only dispose themselves to their functions in consequence of pregnancy. Although it may have happened that men have had milk, as it has been stated, and that this milk has been different from a species of serous fluid with which the breasts of young persons are more or less filled towards the age of puberty, we may dispense with the enquiry after the cause of this rare phenomenon.

Are not these reflections, then, which might be carried to a much greater length, as it would be difficult to explain all the phenomena relating to this subject; are they not sufficient to authorize the assertion, that the excretion of milk depends, at least in part, as we have already said, on the particular erection of the breasts themselves?

A Case of Hæmorrhage, which terminated fatally, from the Application of a Leech. Communicated by Anthony White, M. B. Surgeon to the Asylum, Consulting Surgeon to the General Penitentiary, and Assistant Surgeon to the Westminster Hospital.

[From the London Medical Repository, for January, 1819.]

It has been rarely, if ever, recorded, that the application of a leech has been directly productive of death to the person on

whom it was placed: such an occurrence I have once witnessed; and on several occasions my assistance has been requested to restrain hæmorrhage which had continued many hours, and where every usual method had in vain been adopted, and where the blanched and exhausted condition of the patient was not sufficient to cause a spontaneous cessation of the flow of blood. The case of death to which I allude happened in my immediate neighbourhood: the circumstances were the following. A gland under the angle of the jaw became enlarged and painful, in a female child two years and a half old: the mother, at the request of her apothecary, placed a leech on the tumor; the direction given was, that when the leech had fallen off, a large poultice was to be applied to the bite, into which it might bleed; and it was requested that the poultice should be kept on all night. The leech was applied at night; the poultice also; the child put to bed: thither also, at the same time, went the mother.

The next morning the child was found with pallid face and bloodless lips, and its whole body bedewed with chilly sweat, the usual precursor of death, arising from slow hæmorrhagic exhaustion. The blood had flowed during seven hours, and was found in a large coagulated mass under the sheet. The unhappy mother had, of course, slept during this period: the volatile and other stimulants which I directed to be administered were of no avail; depletion had gone beyond the recoverable limit, and the patient died before I left the house.

It is remarkable that in this exhausted state blood was yet slowly oozing from the leech wound; and I have witnessed, in many other instances, where, even during fainting, the blood has flowed from the peculiar bite of this animal. Children, on account of many inflammatory affections, and where the use of the lancet is impracticable, become the frequent subjects of leeching; and many parts of the body, from structure and situation, are illy calculated to bear pressure, or to have it effectually applied. The relation of the following case, which led me to adopt a method of restraining hæmorrhage, is an example:—My friend, Mr. William Pritchett, had directed leeches to be applied over the trachea of a child affected with croup; the bleeding from one of the

punctures became alarming; styptics, after the usual fashion, had been in regular order applied, and all as regularly failed. On my seeing the child with Mr. Pritchett, I found it much exhausted, and the blood pouring over the throat in a rapid stream. The weak condition of the patient forbade me to reiterate the attempts which are usually adopted, and on closely inspecting the parts, a small pulsating arterial stream was discernible. On the spur of the moment the following method was adopted: I procured a fine sewing needle, which I passed through the leech-bite, piercing as much of the skin on each side as was sufficient to obtain a moderately firm hold: the bite or wound thus transfixed, I conveyed beneath the needle a few turns of common thread, which gave me complete and effectual pressure on the orifice. The method used by the farriers after bleeding the horse, which is to pass a pin through the orifice, and afterwards to wrap round or behind the pin a piece of hair or flax, nearly resembles the plan I adopted. A piece of cork or wax was adjusted on each end of the needle, which the next day was removed: the portion of skin necessarily pierced on each side of the wound is so small that very little pain is experienced by the operation. The plan is so simple, yet so certainly effectual, that I have for the last five or six years constantly adopted it, where, from situation or structure, pressure was inadmissible; or danger, during the night, of a recurrence of the bleeding was apprehended. In a very recent case in which leeches had been applied over the scrotum of a boy eight years old, with a congenital hernia, and where, arising from three of the punctures, hæmorrhage had returned during the night, the patient was with difficulty recovered from its excess, the needles were effectually applied. I have from this circumstance thought the subject of sufficient importance to the community to give publicity to the method which has invariably succeeded. The throat, scrotum, and perinæum, are parts of the body to which leeches are frequently applied, and which, from situation and structure, are ill adapted to receive or bear pressure: when the bleeding cannot be restrained with facility in these situations, I have oftentimes saved my patient much exhaustion

and alarm, and myself much trouble, by adopting the plan I have explained. Where the leech, with its teeth, has punctured a large cutaneous artery, which not unfrequently happens, and where, from its imperfect division, contraction cannot take place, I have occasionally succeeded in restraining the bleeding by pushing the point of a lancet into the leech puncture; but this method is uncertain of success. From the report of many of my professional friends it is certain, that infants occasionally perish from the effect of leech punctures; and many cases of great hazard, no doubt, frequently occur from the same cause to children beyond the infant age, and even to adults of delicate and lax structure. The circumstances connected with each case will regulate the adoption, among Practitioners, of the method which I have recommended. The histories I have detailed are of themselves, I trust, of sufficient importance to warrant this very simple, yet effectual, method of restraining hæmorrhage, being the subject of communication to the medical public.

Parliament Street.

SELECTED REVIEWS.

The Influence of Civic Life, Sedentary Habits, and Intellectual Refinement, on Human Health and Human Happiness; including an Estimate of the Balance of Enjoyment and Suffering in the different Gradations of Society. By JAMES JOHNSON, Esq., Surgeon to his Royal Highness the Duke of Clarence, author of the "Influence of Tropical Climates on European Constitutions," of a "Practical Treatise on Derangements of the Liver, Digestive Organs, and Nervous System," and editor of the "Medico-Chirurgical Journal." 8vo. pp. 93. London, 1818.

[From the London Medical Repository, for September, 1819.]

WE have read this little volume with a degree of attention equalled only by the gratification which its perusal has inspired. Alike amusing and instructive, it is written with all the intelligence and spirit that characterize the productions of its well-known author: and if Dr. Johnson were as successful in establishing the practice, as he has been in demonstrating the truth, of the important doctrines which it contains; if he could impress upon the public mind a deep and practical conviction of the advantages of dietetic moderation during health, and the value of abstinence in disease; we hesitate not to declare, that he would confer a more substantial benefit on his country than any writer of the present or preceding age; and perhaps contribute more largely to her real happiness than any of those warriors whose heroic achievements have shed such a bright though delusive splendor over her history, or the statesmen to whose genius and eloquence her Senates have been wont to bow.

But of consequences thus fortunate we utterly despair. Every one, conversant with the natural obliquities of the human mind, however it be gifted with original talent, or improved by culture and experience, will allow with us, that

such a revolution is, in times like these, more to be wished for than expected. Even within our own sphere of observation, every day brings with it some lamentable proof of the irresistible propensity to excess, although invariably followed by suffering and complaint; and that too in persons whose intellectual powers might raise them above the suspicion, as it should do above the influence, of this degrading spirit. If such then be the case with the more enlightened classes, what can we expect from those over whose sensual appetites neither reason, philosophy, nor the elevating sense of conscious dignity which they usually inspire, exerts its salutary restraint; and who find in the gratification of their brute pleasures, their only solace or recreation from a life of care and labour. Indeed it is but too true, that to restrain the appetites and passions of the multitude, even in their most obviously destructive tendencies, is an attempt equally vain and desperate as that of arresting time in its progress, or repressing the fury of the ocean when agitated by the storm.

Hopeless, however, as is the prospect of any general revolution in the habits of the country, with respect to dietetic indulgences, much, we are convinced, might be effected by the steady and consistent exertions of the medical Profession, towards diminishing the enormous mass of wretchedness and disease of which they are productive: and in this view, we really consider both ourselves and the public deeply indebted to Dr. Johnson, for the pleasing and forcible manner in which he has illustrated the value of moderation and the consequences of excess; and in his estimate of the enjoyments which they yield, he has invariably shown the balance to be in favour of temperance and simplicity.

Still be it recollected by professional men, that precept, however eloquent, is, unless sustained and illustrated by example, utterly unproductive. If we wish to inculcate temperance on those around us, we should study to acquire and to maintain a character for temperance ourselves. In vain may we declaim on the importance of simple and abstinent habits, if we show not by our own conduct that we have sufficient confidence in the result to resist the temptation of their infringement. With equal grace and effect may the physician

declaim on the virtues of a frugal meal, while gorging his own ill-fated stomach with all the heterogeneous poisons of the turtle feast; or prescribe water with one hand, while with the other he pours down copious libations of alcohol to the jolly god.

It may even be contended that medical men are, to a certain extent, responsible for the habits of the district in which they practise and reside. The sins of omission, though less flagrant in their aspect, are frequently almost as pernicious in their consequences as those of commission: and the practitioner who does not his utmost to resist the encroachments of drunkenness and gluttony on the well-being of those around him, is surely little less guilty than the man who, by his open and unblushing example, contributes to propagate the dire contagion. May not a spirit of intemperance, assuming a decided prevalence in any particular tract of country, frequently admit of explanation on this principle? Poets may point their epigrams, or philosophers vent their bitterness of disappointed pride, at the expense of the physician; the ignorant, in the hey-day of health, deride his character and resources; but the hour commonly arrives, when the flashes of wit, the tone of supercilious arrogance, and the pointless attempts of vulgar sarcasm, are exchanged for the more humiliating language of complaint, of confidence, and implicit submission to his dictates: and then what a strong and lasting influence over the opinions and conduct of his patient the once despised man of art is frequently enabled to acquire, they alone who are conversant with scenes of human suffering and depression can adequately comprehend. Nor are the extensive purposes to which this influence may be subsequently converted more valuable in the hands of conscientious and consistent practitioners, than pernicious in those of the profligate and unthinking. The celebrated Dr. Darwin is said, by his doctrines and example, to have effected a complete revolution in the previously intemperate habits of the gentlemen of a whole county.

These are, perhaps, ungracious and unpalatable truths: but experience has convinced us of their correctness; and we deem it a duty to record them. It is now, however, high time to

return from this awkward and perchance unprofitable digression, and retrace our steps to the path from which we almost unconsciously deviated.

The work of Dr. Johnson consists of a preface; an introduction, on the impulse of civic associations; and three chapters, with their corresponding divisions, wherein the influence of civic life, &c. on *the digestive organs*, through the medium of *food*, *drink*, *air*, *sedentary habits*, *mental emotions*, *late hours*, and *medicine;* on *the heart and circulating vessels*, through the medium of the *digestive organs*, *skin*, and *passions;* on the *lungs* and *glandular system;* on the *animal* or *muscular system;* and on the *brain* and *nervous system*, through the medium of the *digestive organs*, *heart*, and *passions;* is respectively traced and developed with a very strong and masterly hand. The whole is terminated by an estimate of the balance of enjoyment and suffering in respect to the intellectual system.

Into a laboured analysis of the substance of this interesting volume, we do not propose to enter; for, in the first place, its excellence consists, not so much in any striking originality of fact or opinion, as in the soundness of the physiological and pathological views disclosed in it, and the apt and familiar and perspicuous manner in which they are illustrated: and, secondly, we are unwilling to obviate, by the exhibition of a sketch which, after all, can afford but a very imperfect notion of its value, the necessity every one of our readers, anxious to keep pace with the progress of the science, will doubtless feel, of cultivating an acquaintance with the original. Indeed, as the production of an active, highly intelligent, and experienced observer, it contains views and observations, an ignorance of which would be alike disgraceful and detrimental to the practitioner; and, as clearly exposing the more common agents whereby the beautiful regularity of function in the human economy, essential to health and happiness, is troubled or destroyed, and the leading principles upon which such disorders may be rectified or prevented, it possesses no feeble claim to the attention of those enlightened men who study medicine; and so all who aspire to that character should study it,

as a branch of liberal education—an important link in the vast chain of universal science.

The following extract, the only one which our limits allow us to transcribe, will sufficiently indicate the correct and comprehensive views entertained by Dr. Johnson, upon the subject of diseases and their remedies. We select it the more willingly, because we feel, and wish to bear testimony to the justice of the reproof which it conveys. Not even Mr. Bailey himself, of Belladonna celebrity,* relied with more implicit confidence upon the unfailing virtues of his deadly narcotic, in the treatment of neuralgia, than we, in unriper years, on our favourite combination of opium and calomel. Experience has, however, shown us the fallacy and danger of such sweeping conclusions. And we are anxious to expiate our error in the only way in which expiation is practicable—by its manly and public avowal:—

"It has been a just cause of reproach to this country in particular, that we are fonder of studying remedies than indications; that is, that we hunt too much for specifics, and do not sufficiently attend to the minute features, phenomena, and causes of disease, by a knowledge of which we might more effectually employ those remedies we already possess. Let us exemplify this observation. A lady is seized with that painful affection, tic douloureux, or face-ach. One person recommends calomel and opium, as an effectual remedy; a second proposes Fowler's solution; a third asserts, that belladonna is a specific; a fourth, that cutting the nerve is the surest remedy. Now, any *one* of these may happen to be the right remedy; but they may *all* be wrong, and the poor lady may run the gauntlet before she is cured. Thus, if the face-ach be merely symptomatic of some derangement in the liver or digestive organs, the calomel and opium will probably be successful: if the disease arise from a translation of gouty or rheumatic irritation to the part, Fowler's solution may stop the paroxysms of pain: if it be, as it seems, a purely nervous affection, belladonna may remove it: and if it consist in an inflamed state of

* See "Observations relative to the Use of Belladonna," &c. By John Bailey. 1818.

the neurilema, or covering of the nerve, the division of that covering, by the knife, may so empty the vessels as to check the disease: but if, as is often the case, the sentient extremity of a nervous twig be irritated by a carious tooth, the whole of the foregoing means will be useless, and the extraction of the cause alone will destroy the effect."—Pages 39, 40.

With respect to the value of thoracic percussion and abdominal pressure, as applicable to the diagnosis of organic lesions of the heart, Dr. Johnson seems to assume a tone far more confident and sanguine than our own somewhat extensive experience in their employment, and that of our professional friends, have hitherto been found to justify. It were needless to observe how greatly the character and utility of any instrument are eventually injured by an extravagant appreciation of its worth; and hence how important to determine, as precisely as possible, the real advantages which may be derived from it. This we propose, ere long, formally to attempt with regard to the two processes in question; and shall now pause only to correct an historical error respecting their original introduction, into which Dr. Johnson has been inadvertently betrayed; Corvisart did not "first recommend" percussion of the chest and abdominal pressure to the notice of the medical world. The former of these processes was, many years since, communicated to the public, by Awenbrugger, a Physician of Vienna, in a Latin work expressly written for the purpose; and subsequently rescued, by the celebrated Frenchman, from the oblivion into which it had nearly fallen: while the latter had its origin with the profound and lamented Bichat; to whom it appears to have been suggested by his observations of the distressing effects of a distended stomach, upon subjects labouring under organic affections of the thoracic viscera.*

There is yet another, and, in our estimation, much more valuable diagnostic sign of a certain class of diseases of the heart, to which we are surprised that Dr. Johnson has not even adverted; since it is scarcely possible that a phenomenon,

* See Mémoire sur l'Application comparée de la Percussion de la Poitrine, et de la Pression Abdominale. Œuvres Chirurgicales de P. J. Dessault. Par X. Bichat. Tome III. page 340.

so common and so conspicuously marked as this, can have escaped his penetrating eye. We allude to a peculiar undulatory pulsation, or rather alternate turgescence and collapse of the external jugular veins. It is most commonly seen in those cases wherein great irregularity of the heart's functions is complicated with enlargement of the liver, and peritoneal and general dropy consequent on the obstructed circulation in the venous system of the latter organ. Whenever this phenomenon has clearly and permanently presented itself to our observation, the distressing prognosis, founded upon it, has never once been eventually belied. The hepatic and dropsical complications may, indeed, be removed for a time by mercury and diuretics; but the heart scarcely participates in the relief thus obtained; and the external jugulars retain their irregular thrilling action. In a short time the abdominal affections fail not to recur with aggravated and often ungovernable violence. The patient sinks; and on dissection, we believe, will be commonly found contraction of the auriculo-ventricular opening of the right side of the heart, and dilatation of the corresponding auricle; thus elucidating, almost with the clearness of demonstration, the source of the phenomenon exhibited by the jugular veins, and the cause of the obstruction of the liver, with its concomitant effusion of serum.*

Again; in a science which rests, like that of medicine, upon the accumulated observation and experience of ages, we feel ourselves utterly at a loss to comprehend how any writer can assert, as our author has done in his preface, that he is totally unindebted to other men's ideas in the construction of his work. Such an avowal is not less ungracious than substantially incorrect, since we all are daily, however unconsciously, availing ourselves of the labours of others; and hence unworthy of the liberal and elevated character of *Dr. James Johnson*. For ourselves, while with the very instrument of correction in our hands, we are proud to acknowledge the valuable hints and sound instruction which we have, on many occasions, derived from his able and impressive writings.

One more observation, and we have done. That the beauty

* We are not aware that this appearance has been noted by any author.

and effect of Dr. Johnson's fine and even fascinating style, should be so frequently slurred by the injudicious admixture with stale, or, perhaps, sometimes irrelevant quotations from the poets, we, in common with many of his best friends, have long in silence lamented. Would that any thing we could say might open his eyes to the flagrant injustice of which he is thus guilty towards himself; and, to employ his own figurative language, convince him of the impolicy of the attempt to entwine the wreaths of poetry around the severe and unbending brow of science! We sincerely revere his talents. We feel an interest in their effectual application, more deep and anxious than he will perhaps be inclined to credit; and would willingly incur his temporary displeasure, if, by so doing, we might promote his lasting welfare, and conciliate his lasting esteem. Conscious we are, that when time shall have somewhat tempered the enthusiasm of his feelings, he will look back with an eye of regret upon the errors to which we have adverted, and acknowledge, with us, that the language of the muses is not more inapplicable to medicine, than that of indiscriminate eulogy to the duties of sterling friendship. Meanwhile, we shall, indeed, feel gratified if the admonition or applause, here uttered, should have the effect of removing any obstruction, or cheering him onward in his ascent to that proud elevation of rank and character, which evidently constitutes the goal of his unceasing labours and aspirations; and which, we confidently predict, he is, ere long, destined to attain.

An Inquiry illustrating the Nature of Tuberculated Accretions of Serous Membranes, and the Origin of Tubercles and Tumours in different Textures of the Body. With engravings. By John Baron, M. D. London. Longman and Co., 1819, pp. 307.

[From the London Medical Repository, for August, 1819.]

In that part of the "general review" which occupied a large portion of our preceding number, we took some notice of this volume. We acknowledged the ingenuity with which the author had treated the subject; we expressed our pleasure to

find him unshackled by those fashionable theories which refer every thing pathological to vascular impetus and inflammatory action; but we remarked that Dr. Baron's particular views regarding the origin of tubercle and tumour required more time and attention than we could then spare. Since those observations went to press, we have taken some pains to examine the foundations of those pathological views which this author supports. The importance of the subject, the mass of information which he has collected together, the acknowledged talents of the author, and the extent of experience which his situation, as Physician to the General Infirmary at Gloucester, has given him, all entitle them to a candid examination; and if we differ from him, and even ultimately form a less favourable opinion of his work than our first impressions might have led our readers to expect, we trust he will believe that we are still very sensible of the value of his observations, and thoroughly satisfied that the object of the learned and benevolent author is to "advance the cause of knowledge, and mitigate the sufferings of humanity."

This volume is only the commencement of a work, whose extent is not very easily to be defined; for no one, by reading the first chapter, could possibly imagine that it was to branch out in the manner which it does towards the end. It is divided into two parts, the first of which comprises remarks on the tuberculated accretions of the peritonæum, and gives us a glimpse of the author's views regarding the connexion between tubercle and hydatid. The second part treats of the tuberculated accretions of the pleura, and unfolds the full extent of those speculations on the origin and connexions of tumour, tubercle, and hydatid, which it is the chief object of this book to promulgate. As the opinions of the author are, to say the least of them, very singular, we naturally expected to find them brought together in a sort of tangible shape, towards the conclusion of the volume; but we were grievously disappointed to arrive at the last page without any such summing up, which the author says "it is perhaps wise to abstain from for the present." We say we were much disappointed at this, because it put us under the obligation of reading the book through once more, in order to lay them before our readers;

setting aside the risk, that in making such an attempt ourselves, we may not be dealing very fairly with the author. We flatter ourselves, however, that he will not have much occasion to find fault with us, when we say, that the following seem to be the principal conclusions to which he comes:—

1. That there is a disease of the peritonæum and other serous membranes, characterized by the formation of tuberculated accretions, which, though frequently mentioned by authors as occurring, has never yet been regularly inquired into, so as to establish its pathological connexions.

2. That this disease of serous membranes, and several others with which it is pathologically associated, have hitherto been considered as originating in inflammation; but that this opinion is gratuitous and erroneous.

3. That the diseases with which this peculiar tuberculous affection of serous membranes, and especially of the peritonæum, are connected, are tubercles in the lungs, and tubercles and tumours in various other parts of the body, cancer, fungus hæmatodes, "the whole tribe of cachectic diseases," and possibly some diseases of bone.

4. That tuberculated accretions of serous membranes and these various kinds of tubercles and tumours are closely connected, in a pathological point of view, with the formation of hydatids: that hydatids are the sources of all these morbid structures, and that they are susceptible of transformation "from the simple watery vesicle up to the schirrous and cartilaginous texture."

5. That this question is totally independent of the origin of hydatids themselves; but that the notion of their being animals is by no means satisfactorily made out.

6. That the diseases now referred to "belong to an important family, whose origin may be more satisfactorily ascribed to the absorbent than to the sanguiferous system."

Such are the leading points of Dr. Baron's speculations; and we must confess, that however desirous we are to see the minds of our pathological writers divested of the prejudice which makes inflammatory action necessary to every change of organic structure, we are yet startled at the boldness of some of the conclusions which we have now detailed, and which

the author does not announce with any degree of diffidence, except indeed on one occasion, only, as far as we can remember*; but considers as fully proved; referring to his "well supported train of reasoning," and to authors who "caught glimpses of the right track," and "advanced near to the discovery of the truth, without actually penetrating the veil."

When an author uses these and similar expressions, it is to be presumed that he has cleared the subject from the mists of prejudice, and brought forward such arguments as must carry conviction to all. We are afraid, however, that there are still many who will refuse assent to these doctrines, and who, if they even acknowledge the insufficiency of former theories, will hesitate ere they adopt the explanation which the author of the present treatise wishes to substitute. It is time, however, that Dr. Baron should speak for himself; and we think we can introduce all that is really important in the book to the notice of our readers, by making a few observations on each of the six leading points of doctrine which we have stated it to be his object to inculcate.

In the first chapter of the work, Dr. Baron gives a most excellent detail of a number of cases of that tuberculous disease of the peritonæum which appears to have been the first to attract his notice. Many of these occurred in his own practice, and some are transcribed from the works of former authors. The frequency of this disease is probably much greater than is generally imagined. In our own practice we have seen a very considerable number of cases of it: and the author of this volume, by directing the attention of the profession in so particular a manner to this very singular affection, has conferred on us a very essential benefit. We are rather surprised, however, that in this division of the work no mention was made of Dr. Pemberton's valuable treatise on the diseases of the abdominal viscera, in which this affection is very admirably described, under the title of chronic inflammation of the peritonæum. Dr. Pemberton, it is true, does not make any distinction between simple adhesion and the granular or tuberculated disease of the membrane; nor does he even mention

*Page 198.

"those fleshly and vascular appendiculæ or tubercles being suspended, like grapes, from its surface, into the cavity of the abdomen," which constitute the peculiarity in the morbid appearances presented by the disease under consideration; but he distinctly describes the insidious origin, the slow progress, the symptoms, diagnosis, and prognosis of the complaint, and the principal other appearances found upon dissection; particularly the agglutination of the bowels into one mass, the great thickness of the peritonæum, and the occasional throwing out of a dropsical fluid. In the chapter on diagnosis*, no attempt is made to establish a distinction between the chronic peritonitis of Dr. Pemberton, which we have always been led, from the day we first entered on the profession, to consider a disease as strongly marked as any in the whole nosology, and the tuberculous disease of the membrane. We are at a loss, therefore, to know whether the author was aware of Dr. Pemberton's accurate description of such an affection, and whether he considers it the same, or different from that of which he treats.

For our own parts, we are inclined to think that there is a tuberculous disease of the peritonæal membrane, different from common chronic peritonitis; but we confess our inability, in the present state of pathological knowledge, to determine, with any degree of certainty, their diagnostic symptoms. Before any such attempt, however, is made, it will of course be necessary to *establish* the position which we have only ventured to suggest as a matter deserving of inquiry.

2. Dr. Baron imagines that chronic inflammation is incapable of explaining the phenomena of this affection of the peritonæum. His words are, "Nothing that is known of the physiology or pathology of the sanguiferous system seems capable of explaining what we are now in quest of†." Against the general doctrine of chronic inflammation he sets his face in every part of the book. We scarcely recollect that the phrase is ever used. Now upon this point it is right that we should come to some understanding with the author. As we said in our last number, we are perfectly ready to admit that we

* Chap. iv. page 38. † Page 85.

"daily found cysts, containing fluids and substances of various kinds, imbedded in the viscera, or attached to them, or appearing on the surface of the body, when no perceptible inflammatory symptoms existed;" that "inflammation is not always a cause of altered structure; but that it many times is a consequence rather than cause of that state;" that "tubercles in the lungs exist anterior to inflammatory action; and scrofula, in its commonest forms, shows itself in lymphatic obstructions and tumefactions, long before other changes take place:" but we do not exactly see how all this is applicable to a particular disease of the peritonæal membrane; still less, that chronic inflammation of vessels is altogether to be kept out of view, in attempting an explanation of its appearances. There is a curious passage from the writings of Bichat quoted by Dr. Baron, page 74, wherein that ingenious author notices the peculiarity of this disease of serous membranes, the "productions d'une foule de petits tubercules blanchâtres qu'il est si frequent de trouver sur ces membranes." At one time he speaks of it as a chronic inflammation; at another he maintains that it should be arranged in some other class than that of the phlegmasiæ, and that it should be considered as characterized by the formation of little tubercles, and an affection peculiar to those membranes, as miliary eruptions to the skin, or aphthæ to mucous surfaces. The same difficulties that struck Bichat, and which betrayed him into this inconsistency, appear to us still to involve the question, nor have the few arguments which Dr. Baron brings against the theory of chronic inflammation, consisting chiefly of one or two extracts from Dr. C. Smyth's paper on the varieties of inflammation, been able to solve them to our satisfaction. Dr. B. indeed adds two cases which appear to him to prove "the occurrence of inflammation with all its well-marked symptoms and consequences, after the change of structure peculiar to the former disorder, the tuberculous disease, had existed." These cases are certainly in point, but they do not affect the leading obstacle to the establishment of the new theory, viz: whether there are any cases which from their commencement deserve the name which Dr. Pemberton, we believe, first gave them, of chronic peritonitis. We conceive there are, and that Dr. Baron has erred

in not drawing any distinction between them and the cases of pure tuberculous disease. We cannot, therefore, subscribe to the position which he has advanced, at least in the extended sense in which he wishes it should be taken; "that chronic inflammation cannot be assumed to illustrate the origin and progress of a great variety of the most fatal and alarming chronic diseases, without involving the reasoner in the most palpable contradictions and absurdities*."

In page 121, we read that "disappointments in the treatment of the tuberculated disease of the peritonæum first led the author to distrust the doctrine which gave inflammation for its cause;" and in page 122, "that he soon abandoned the idea of chronic inflammation." Now, without offering an opinion as to the pathological question which this sentence involves, we would wish to ask, Whether there is not something illogical in this style of reasoning, and whether it would not equally apply to any other theoretical speculations on a disease, which the author is candid enough to acknowledge "no remedies in our present state of knowledge can subdue, and which generally leads to a fatal termination†?" Dr. Baron, in support of his theory, brings forward John Hunter's observations on collections of matter which are formed without inflammation. But were we disposed to prosecute the subject further, we would ask, Whether, in such cases, there may not take place what Dr. Baillie has conjectured to occur in some diseases of the trachea, a peculiar action of vessels analogous to, but differing from, inflammation‡?

We shall presently find that Dr. Baron, when disappointed with the inflammatory action of blood-vessels, seeks a substitute in a very different quarter.

3. The author tells us that his views gradually enlarged during the progress of his inquiry, and assumed at length a comprehensive aspect, the extent and bearings of which, if seen at first, might have deterred him from entering on so wide a field of discussion. In fact, it is curious to observe how the subject "grew upon him." From contemplating an obscure affection of the peritonæum he began to associate it with simi-

* Page 117. † Page 18.
‡ Baillie's Morbid Anatomy, page 99, 125.

lar diseases of other serous membranes. He extended his views to tuberculous formations in all textures of the body, particularly to tubercles in the lungs. His next step seems to have been to unite them with the different varieties of physconia. Cancer, fungus hæmatodes, fatty tumors, and some diseases of bones, are next brought within their influence, until at length he thought he could trace the connexion between the tuberculated disease of the peritonæum, from which he set out, with "the whole tribe of cachectic diseases, and a vast number of disorganizations which occur under various modifications in every texture of the body."

Now there is something in this sweeping system of generalization which does not accord with our ideas of the intricacies and difficulties of the science of pathology, of the slow march of general science, or of the extent of original observation, likely to fall within the scope of any single inquirer. To establish upon a sure basis the pathological doctrines connected with any one of these morbid derangements of structure, would ensure lasting fame to an author; and we confess we should have looked with a less jealous eye upon the foundations of the reasonings contained in this volume, if we had observed less tendency to make them applicable to such various modifications of disease. We are quite satisfied, that in the science of medicine the truth does not lie so near the surface as such speculations would lead us to suppose. We have only to look back to the style of medical reasonings, as presented to us in the best authors of the last century; nay, we have only to cast a very superficial glance at the *present* state of medical science, to convince ourselves, that the steps in the progress of its improvement are made very slowly, and that all attempts to grasp, by a premature effort, the labours and triumphs of posterity, have been, and will probably continue to be, unavailing.

That there is a disease of the pleura and of the arachnoid membrane, and of the capsular ligaments of joints, very similar to that of the peritonæum which Dr. Baron has so fully detailed, we have no doubt; and it will be for him to point out the connexions of these diseases, and the analogies that prevail in their origin, progress, and symptoms. By so doing,

we may safely venture to predict that he will be conferring a benefit on science; but we would suggest, that this should be done before any other link is added to the chain; and, at any rate, we must take leave to enter our protest against any train of reasoning, which would, without the amplest proof, associate together diseases, which, whether rightly or wrongly, we have for centuries back been in the habit of considering as fundamentally different.

These remarks we wish to apply particularly to the case of tubercles of the lungs. Authors have agreed, from very early times, in acknowledging the obscurity which hangs around the origin of these bodies; and we have been long desirous that this subject, opening so important a field of investigation, should be prosecuted by some one who will devote that time to it, and give it that degree of consideration from which we might hope to derive advantage. We have little hesitation in saying, that such a result can be looked for only from such means, and that the inquiry must begin, and perhaps will end in the particular structure in which such appearances are met with. The hopelessness of any attempt to establish an affinity between tubercles of the lungs and the great variety of morbid changes of structure, which we have stated to be comprehended within the author's views, must, we think, be obvious to every one who is at all conversant with morbid anatomy.

4. But the greatest novelty in Dr. Baron's speculations is his attempt to point out the connexion of tuberculated accretion, of tumour, and tubercle, with hydatids, and to show that *they* are, in fact, the real origin of all the modifications of structure which we have detailed, and susceptible of transformations hitherto, we believe, unthought of; that is to say, from the simple watery vesicle, up to the schirrous and cartilaginous texture. To confirm this point, all his reasonings tend; and we must do the author the justice to say, that he has laboured it with great ingenuity; and if his facts and observations do not fully bear him out in all his views, yet still that he has brought forward much valuable information, which may have great weight in the estimation of some, and which will afford useful reflection to all. The principal argument in favour of his idea is, the circumstance of hydatids being so frequently

found in combination with tuberculated accretion. He mentions, page 110, one very striking case, where tuberculated adhesions were met with on both sides of the pleura, tubercles in the mesentery, the pancreas enlarged with tuberculated adhesions to the neighbouring parts, and where hydatids were found in and upon the liver, and attached to the external surface of the right ventricle of the heart, and a large cyst existed in the posterior mediastinum. The great difficulty, however, is still to be got over:—In what manner is the transformation of the hydatid from its state of vesicle to that of solid tubercle effected, and how is this transformation proved? Upon this point Dr. Baron is very explicit. He tells, that "such transformations were referred to by Boerhaave, conjectured to occur by John Hunter, and actually proved to occur by Dr. Jenner." This last fact not being generally known, it may be worth while to state the grounds on which it rests. Dr. Jenner "demonstrated the position by experiments instituted on some very young animals, particularly rabbits. He found, that by feeding them with some kinds of food, the liver soon became studded with hydatids; and by examinations, at different times, he was able to trace the gradations already mentioned, from the first inspissation of their contents, and thickening of their coats, to their final conversion into tubercles of varying size and hardness. In the same liver he has also repeatedly found every gradation, from compact caseous looking matter, to the limpid contents in their first stage."

Some of the facts connected with this subject were applied by Dr. Jenner to explain the origin of tubercular phthisis. He sent two communications to Dr. Beddoes on this subject, which are to be found in his work on factitious airs; and if the observations on which they are founded are correct, they certainly, as Dr. Baron says, have not yet met with the consideration they merit. Considering how long ago these remarks were published, it does appear surprising that they were never before applied to the explanation of the pathology of tumour and tubercle. We have not had time to make the necessary inquiries into a part of medical science, in which we confess our education to have been very much neglected; but we cannot refrain from the suspicion, that there must be some mistake

either in the observations, or in the reasonings built upon them; or so remarkable a circumstance would not have escaped the notice of Dr. Baillie, whose opinion, by the way, in these matters, we are disposed to rely very much upon, and who, in the last edition of his valuable work, makes no mention whatever of any such conversion of the hydatid vesicle. This, it must be borne in mind, is but a suspicion. If Dr. Jenner be right, the profession is indebted to the author of this treatise for recalling to its recollection an important and neglected fact. Until these experiments and observations of Dr. Jenner are satisfactorily shown to be incorrect, we certainly think the weight of evidence is on our author's side.

On the 5th point which we stated Dr. Baron to have urged, we entirely agree with him. It seems to us quite indifferent, in relation to this question, whether hydatids be, or be not animalcules. The same conversion of them into tubercles and tumours may take place, whatever be their origin and real nature. The author certainly inclines to the idea, that hydatids have not an independent existence, from his expression, page 276, "admitting, for the sake of argument, that they are animalcules;" But Dr. Baillie's remarks* on this subject appear to us to be very strong; and though fully satisfied "that the origin of hydatids is a question of less importance than the consideration of the vast variety of formidable changes of structure to which they give birth†," we think it would have been advisable in the author to have stated his reasons for doubting the commonly received opinions of pathologists on this point.

6. Dr. Baron makes no secret of his anxiety that the absorbent system should take place of the sanguiferous in explaining the origin of tuberculated accretion, tubercle, tumour, and hydatid; but he evidently fights shy of the question in the present volume. The following passages, however, sufficiently point out the tendency of his speculations.

"Disorders of the absorbent system are supposed to occasion many of the symptoms of a numerous, and most unman-

* Morbid Anatomy, page 241. † Inquiry, page 111.

ageable class of diseases. To this class may, perhaps, be referred the disease under consideration*."

"It is a very old opinion, that hydatids arose from the lymphatic system. Many strong analogical facts have been mentioned in confirmation of that opinion, and there is good reason for believing that it will ultimately be proved by direct observation†."

The formation of large tumours by lymphatic vessels appears to us to be a theory involving many very great difficulties, and some obvious inconsistencies: but while we say this, we think it but reasonable to suspend our judgment on this point, which the author by no means presses, until from the forthcoming volume, which is to contain observations on diseases of mucous surfaces, and some other affections of serous membranes, we receive some "further illustrations of the subjects discussed in this inquiry."

We have now gone over, in a very hasty manner, the principal novelties of this volume. There are one or two points, however, which escaped our notice in this review, which we must be permitted to recur to for a moment. By the term *tubercle* Dr. Baron denotes disorganizations composed of one cyst, whatever be its magnitude, or the nature of its contents. By that of *tumour* he understands those that appear to be composed of one or more *tubercles*. All tubercles are originally hydatids; and the process of transmutation of the vesicle into complex structures, or what Dr. Baron calls the arrangement of the elementary parts of morbid growths‡, is not left to conjecture, but is illustrated by a series of observations and diagrams. These are not so satisfactory to us as to the author; but we have no time to dilate further on what seem to be the weak points in the author's theory.

The supposition that hydatids are the original sources of *cancerous* structure, was long ago entertained. Sir Everard Home distinctly states, that he was led, from every consideration he could give the subject, to believe that such hydatids are no part of the poisonous disease; but where found in combination with it, are to be considered as accidental complaints

* Page 86. † Page 301, note. ‡ Page 218.

superadded to the cancerous disease*. Dr. Adams, in his "Observations on the Cancerous Breast," takes a different view of the subject, and maintains that hydatids are essentially connected with the origin of cancer. We were a good deal surprised at Dr. Baron's severe animadversions on these views of Dr. Adams. He maintains, it is true, the animalcular nature of hydatids; but we are at a loss to see why this opinion is "the fundamental error of his book," and why it is calculated to involve the subject, and render what he has brought forward little available to the purposes of true science," when Dr. Baron himself confesses, in the same page, that "the question, so far as pathology is concerned, has nothing to do with the speculations respecting the origin and vitality of hydatids†." This, considering how very nearly Dr. Adams's notions accord with his own, appears to us to show a want of liberality on the part of the author, which we should not have expected, after the manly avowal in his preface, that "these coincidences are very valuable," inasmuch as "they vouch for the accuracy of different observers, and prove that their minds have not been warped by the influence of preconceived opinions."

We are not among those who maintain, that to constitute a valuable book in medicine, it is necessary that it should contain some new or improved system of treatment. We do not, therefore, consider the merit of this volume at all diminished, because the chapter on treatment is barren of novelties. The only peculiarity that struck us was the recommendation of long continued nausea and vomiting in discussing tubercles, and tumours, and scirrhus, and even in combatting the advanced stages of pulmonary consumption. Dr. Jenner, whose observations on this subject are quoted with approbation, seems to imagine that all our commonest deobstruent medicines act on this principle, digitalis, squills, nitre, white vitriol, &c.; and that the little success which frequently attends their use is perhaps to be ascribed to the too limited mode of their exhibition—to the interval of freedom from nausea being too long. Some curious cases, illustrating the effect of long continued nausea in the removal of morbid growths, are detailed.

* Home on Cancer, p. 108. † Inquiry, p. 277.

Having, in the early part of this article, collected into a focus the principles which the author believes he has established in the course of his inquiry, upon most of which we have taken the liberty to animadvert, it may not be altogether uninteresting to conclude by recapitulating those facts really made out, or, in our opinion, rendered probable, by Dr. Baron. We think, then, that he has fairly made out,

1. That there is a tubercular disease of serous membranes, which has not hitherto been examined in a comprehensive point of view; that it runs a defined course, and that its causes and treatment are involved in much obscurity.

2. That the doctrine of chronic inflammation of vessels is not adapted to explain this and several other morbid modifications of structure, and that it requires further investigation.

3. That hydatids are susceptible of conversion into structures totally different from that which they originally enjoyed; and that they may have their origin in some state of vessels analogous to that which gives rise to the tuberculous disease of serous membranes.

4. That the origin and pathological relations of tumours is a subject upon which much light may still be thrown by accurate observation and cautious deduction.

Further than this, we are not disposed to go: but even these are great steps in the progress of medical science: and we have again to request the author will accept our thanks for the instruction which his very interesting and ingenious volume has afforded us.

A Memoir on Inflammation of the Veins. By G. Breschet, Prosector to the Faculty of Medicine of Paris, &c.

[From the London Medical and Physical Journal, for August, 1819.]

There are but few diseases that have been less understood, until within a late period, than that which forms the subject of this memoir. Observations respecting it may be found in the works of Aretæus, Paré, Dionis, Platner, Boerhaave,

Van Swieten, and Morgagni; but the nature of the affection was not determined until it was demonstrated by John Hunter. Since then, various instances of its occurrence have been published, a general reference to which was given by us on a former occasion, when considering the paper on this subject by Mr. Carmichael in the Transaction of the Association of the Dublin College of Physicians. The cases above alluded to being widely dispersed in medical literature, many of them have hitherto been unknown to the generality of surgeons; though, from the nature of the disease, it is of the highest importance that every one should possess all the information that can be furnished respecting it by historical records. To collect those cases, to arrange them in appropriate order, and to deduce from them some general conclusions, has been the object of M. Breschet in the memoir under consideration; and it is with much pleasnre that we are enabled to offer to our readers the results of the labours of this intelligent and experienced surgeon on so interesting a subject.

We shall, in passing through this memoir, give a reference to the observations which may be supposed to be generally known to English surgeons; an abstract of those which have not hitherto been published in our language, and of those proper to M. Breschet; and conclude with the pathological reflections of this surgeon, and his remarks on the mode of treatment best adapted for their relief.

§ I. *Inflammation of veins caused by phlebotomy.*—In this section, Dr. Breschet adduces the cases related by Hunter, Sherwin, Mr. Abernethy, Mr. Charles Bell, and Mr. Travers; and details three instances of it which occurred to his own observation. The first patient, a man 22 years of age, who, having been bled in the arm several times for epilepsy, suffered after the last pain about the place of the incision; which was followed the next day by redness, tension, and swelling, extending in a few days from the shoulder to a little below the elbow. The pulse was weak and frequent; fever came on, with prostration of strength; very severe pain in the left side of the chest, with difficulty of respiration; which, after a few days, terminated in death. Examination of the parts then showed the cephalic vein to be full of pus

throughout its whole extent. The superficial radial vein contained also pus, until about two inches from its origin.

A woman, aged 20 years, was, on the 20th of July, bled in the left foot, for a vomiting of blood attributed to derangement in menstruation. She soon began to suffer very severe pain about the place of the incision, the edges of which became hard and everted. Swelling gradually extended to the superior part of the limb, accompanied with pain and tumefaction of the inguinal glands, fever, and restlessness. These accidents continued until the 23d, when they began to subside under the use of fomentations, cataplasms, rest, and laxative medicines. The saphena vein was then discovered, hard, tense, and increased in bulk, from about two fingers'-breadth below the ankle to the height of the origin of the tendon of Achilles. Pressure directed towards the opening, not yet cicatrized, produced an evacuation of a small quantity of thick pus, streaked with red. On the 26th, the pains and the suppuration had ceased, and the wound had healed. The vein, although diminished in diameter, still preserved its hardness, when the patient left the hospital on the 5th of August.

A man, 34 years of age, was bled three times within fifteen days from the right arm, for vague pains in the limbs of a year's standing: he was soon afterwards bled also in the left arm. On this occasion, symptoms of inflammation of the median cephalic vein ensued. "This case terminated favourably. On the sixteenth day from the accident, the vein had the appearance of a small cord, much less in diameter than the vein of the opposite side, evidently not admitting of the transmission of blood."

§ II. *On inflammation of veins produced by the ligature of them, and by the excision of varices.*—"We know," says Mr. Breschet, "that Hippocrates punctured varices; Ætius, Paulus Ægineta, Avicenna, and Albucasis, have described a method for the excision of them; that this operation appears to have been practised by Fallopius and Severinus; that the two Fabricii comprised the varicous portion between two ligatures, and emptied it by incision; and that Ambrose Paré, Dionis, Petit, and others, opened varices to extract the coagula from them, and afterwards approximated the sides of the

vessels by compression. Nevertheless, a great number of facts attest, that the ligature and the excision of varices may induce serious accidents, of which death has been a frequent consequence."

M. Breschet then notices the results of the operation of tying the saphena major, practised a few years ago in St. George's Hospital; and the results of a similar measure related by Mr. Travers in his Surgical Essays.

M. Breschet has not noticed the important improvement in the mode of performing this operation, effected by Mr. Brodie, which has been attended with such advantageous results in his practice, and in that of Mr. Carmichael.

§ III. *Of inflammation of the veins after amputation.*—An abstract of the observations of Hunter and Mr. Travers, constitutes this section.

§ IV. *On inflammation of the veins consequent on the ligature of the umbilical cord.*—"Meckel," says M. Breschet, "has witnessed in an infant, a short time after its birth, vomitings, colics, diarrhœa, icterus, fever, and nervous affections: death took place on the tenth day. The peritoneum was inflamed and covered with a false membrane, and there was effusion of pus into its cavity. The branches of the vena porta, and especially those of the umbilical vein, were very tumid, and their parietes much thickened; those of the umbilical vein, and its first branches in the liver, were of the thickness of one or two lines, and were covered with a firmly-adherent spurious membrane. Osiander has published an analogous fact: an infant was attacked with erysipelas, that soon spread all over the body; and it died on the third day from its birth. The intestines and the liver showed signs of inflammation on their external surfaces; they were covered with false membranes and purulent matter. The umbilical vein, from the navel to the liver, contained pus of a yellow colour. Meckel has also furnished us with the history of an infant that was born with a strangulated inguinal hernia, consequent on compression of the abdomen during its passage from the uterus. The hernia could not be reduced before the third day: severe colics remained, accompanied with tympanitic distension of the abdomen, icterus, and vomitings. Death took place on the seventh

day. On opening the body, all the disorganization consequent on peritonitis was discovered: the parietes of the umbilical vein were much inflamed, and covered with pus; and there were spots of ulceration on its internal surface."

The analogous observations published by Dr. Colles,* of Dublin, who has witnessed *trismus* as a frequent attendant on this disease, have escaped the notice of M. Breschet.

§ V. *On inflammation of the crural veins after parturition.*—Several cases of this affection have been published by Meckel.† "A woman died a few days after parturition. A short time after her delivery she was attacked with fever, and darting pains in the cavity of the abdomen and in the pelvis, which after a time disappeared: but, at the end of about three weeks, uneasiness in the region of the liver and in the left hip, and intolerable pain in the left thigh, supervened. On examining the dead body, the abdominal cavity was found filled with purulent matter; the liver was very voluminous, the lungs healthy. The crural vessels and nerves were surrounded with puriform matter. The crural vein, from its origin to the knee, was of the thickness and the firmness of the artery: it was filled with pus and blood. Its tunics cracked under the scissars; its internal membrane, well washed, was more spongy than in the ordinary state, and covered with a very distinct false membrane, which might be detached from it in slips. Its valves were in part corroded, ragged; and in part thickened, tumified, and of a deep-red colour."

The analogous observations of Mr. Travers, Mr. Wilson, and Dr. Clarke, are next cited; and this section concludes with a remark, that "M. Chaussier has frequently seen, in women who died after parturition, the abdominal veins full of sanious pus; and M. Ribes has observed, in a woman who died of peritonitis, at the same epoch, the same veins gorged with purulent sanies."

We may here remark, that, as no mention is made of the state of the vessels themselves in the latter cases, it is not sa-

* Dublin Hospital reports, vol. i. See London Medical and Physical Journal, vol. xxxix., for an abstract of these observations.

† Bibliotheque Medicale, tome xvi.

tisfactorily shown that they were instances of *phlebitis;* the "sanious pus" may have been taken up by them from extraneous sources.

§ VI. *On inflammation of the veins of the uterus and the ovaries after abortion.*—"A woman," says M. Breschet, "having aborted in the seventh month of gestation, the placenta being necessarily extracted by art, was attacked with fever, a miliary eruption, and pains in the loins and in the pelvis. Purulent matter flowed from the genital organs and from the rectum. After death, there was found, between the posterior paries of the uterus and the vagina, an abscess which opened into the rectum. The veins of the uterus and the ovaries were inflamed, their parietes thickened, their cavities ulcerated and filled with pus. The whole of the right renal vein, and the part of the vena cava that receives it, were inflamed, red, tumefied, and filled with a coagulum of blood, which in its middle contained some puriform matter."*

§ VII. *On inflammation of the veins by their direct communication, or their contact with other diseased structures.*—M. Fizeau has published a case† of suppuration in the hepatic veins, connected with organic affection of the biliary canals; in which M. Breschet is disposed to attribute the inflammation producing the former affection to the latter cause. M. Breschet next adverts to the observations on this subject in the essay of Mr. Travers, and then relates a case that occurred to M. Patissier: "In a subject who died of tetanus, the internal membrane of the auricles and ventricles of the heart, especially of the right side, were found of an intense red colour, chiefly at the basis of the mitral and tricuspid valves: the internal membrane of the aorta, the common trunks of the carotids, the subclavian arteries, the inferior vena cava, the jugular veins, and the pulmonary artery, presented red appearances that dimished in proportion as they diverged from the heart, which were not removed either by repeated washing, or even on scraping the membrane with a scalpel."

M. Ribes has often met with inflammation of the veins in erysipelas. He says, that, if this disease induces suppuration,

* Bibliotheque Medicale, tome xvi. † Ibid. tome xxxviii.

which is very rare, the parietes of the veins are red, especially the internal membrane; their thickness is also increased, and their cavity filled with pus. In the case of gangrene, they are black, easily torn, and contain sanious matter. If the gangrene has not proceeded to the last stage, the parietes of the veins are a little dilated and very thick; their internal membrane, at the circumference and in the neighbourhood of the focus of the disease, is red, and visibly inflamed: they contain pus or sanies. M. Ribes has sometimes met with this sanies to the extent of several inches from the focus of the malady.*

§ VIII. *On inflammation of veins produced by metastasis.*—A boy, 14 or 15 years of age, was affected with an eruption that had been considered to be the itch, which soon disappeared on the use of some ointment. He was almost immediately attacked with violent and continued pain in the right lower extremity, which became the seat of serous effusion. When he entered the hospital, he had all the symptoms of what is commonly termed nervous continued fever: he died after about three weeks. The vena cava was blackish in colour in some parts, whitish in others, was easily torn, and contained a white medullary matter, not coherent, which increased in quantity as it extended towards the iliac trunks, before the bifurcation of which the vessel was dilated and completely obstructed by the matter just described. The trunk of the left iliac veins was also obstructed by it; and the branches of it, although much dilated, entirely empty. In place of the iliac trunk of the right side, there was a sort of ligamentous canal, with thick parietes, and extremely small calibre, which terminated in a vast abscess formed in the cellular tissue surrounding the hypogastric and iliac vessels. Notwithstanding the most careful research, not the least vestige of the right crural vein could be found: its course was occupied by a train of pus, which extended to the ham. The veins of the right leg were contracted, and filled with solidified fibrine.

§ IX. *On inflammation of veins from chemical or mechanical causes, the presence of worms, &c.*—Treutter, Fabricius,

* Memoires de la Societe Medicale d'Emulation, tome viii.

and Rudolphi, describe worms which have been found in veins. Pus absorbed from ulcers of a malignant character, hospital gangrene, &c. some cases of caries of the bones, have been attended with inflammation of the veins. Sasse produced it in dogs, by injecting solution of opium, and tincture of euphorbium and cantharides, either into the jugular veins or into the cavity of the abdomen.

We have now to adduce the general conclusions of M. Breschet on the pathology of inflammation of the veins, and the appropriate measures for the relief of that disease. As these consist of observations rather than opinions, and are drawn up in a concise and perspicuous manner, we shall give them in detail, and without any particular remarks, as the accuracy of the author's descriptions, and the utility of his labours, must be sufficiently apparent. Dr. Breschet observes, that

"Inflammation of the veins may be either idiopathic, sympathetic, symptomatic or metastatic.

"*Physiological characters of inflammation of the veins.*—The signs of inflammation of the veins are not always easily recognized; particularly if the inflammation is seated in the small vessels, or even in the trunks, when they are situated in the visceral cavities.

"1°. *Local characters.*—The consideration of the precursory circumstances; pain in the course of the veins; swelling of the adjacent cellular tissue; sometimes redness and tension of the skin; its sensibility and shining appearance in the passage of the vein; and afterwards a knotty, tense, and painful cord, in the particular direction of the vessel, are the most ordinary phenomena of this inflammation. If a wound exists, there may be an evacuation of blood altered from its usual appearance, or of pus more or less thick in consistence, from the orifice of the vein. In the latter case, soon after the lesion of the vessel was effected, there is pain in the wound; swelling comes on; the wound does not unite by the first intention, its edges become hard; or, if it has cicatrized, an abscess forms under the cicatrix, and soon destroys its continuity. The pains which occur in the course of the inflamed vessel are more particularly directed towards the heart than towards the extre-

mities; they are augmented by pressure, and they have sometimes been supposed to be rheumatic. A sensation of burning heat follows exactly the same direction as the pain.

"2°. *General Characters.*—It is rare that inflammation of a vein, especially if it has existed some time, is not accompanied with disturbance of the system, or a real febrile state, the intensity of which varies according to that of the inflammation, the extent of the disease, its seat, the importance of the vessel, and the tendency of the local affection to one or other mode of termination. It should be remarked, that many physicians have observed in these circumstances the phenomena of typhus; and I have myself found, in many subjects who had fallen victims to typhus, evident traces of inflammation in the encephalic veins and in the venous sinuses of the cranium. The duration of inflammation of veins is occasionally very short; most frequently, it is of rather long continuance: and it appears, from the observations of M. Fizeau, that this phlegmasia may be remittent, presenting actual paroxysms of exacerbations of the symptoms.

"Inflammation of the veins may be confounded with that of the arteries, the lymphatic vessels, or of the nerves. In the first case, the pain and the other external characters are directed from the point where the artery has been injured towards the branches of the vessel. In the second case, the pain may extend in the direction towards the heart, but the lymphatic glands swell, become painful, and the skin often presents two or three red waving lines, which appear shortly after the lesion or pricking of the vessel; and it is not long before tumefaction of the whole member takes place.

"Lastly, if the nerve be the seat of the malady, the pain is propagated from the situation of its origin to a common centre, and especially from the situation of its ramifications: it is instantaneous; it immediately follows the puncture; and this pain has varieties of character, as we observe in the neuralgiæ, which are often only chronic inflammations of the nerves.

"*Anatomical characters of inflammation of the veins.*—Inflammation of the veins may terminate in several ways. We do not possess well-authenticated facts to prove that it, in any cases, terminates in resolution; and that the vessel, being re-

stored to its former state, executes the functions for which it was primitively adapted. Union of its parietes, obliteration of its cavity, suppuration, ulceration, and gangrene, most commonly take place. Thus, phlebitis appears under the following forms: 1°, adhesive inflammation; 2°, suppurative inflammation; 3°, ulcerative inflammation; 4°, gangrenous inflammation; 5°, eliminatory inflammation.

"1°. *Adhesive inflammation of the veins.*—John Hunter and M. Dupuytren think that adhesive inflammation may exist in veins; and it is indeed by that, that wounds of these vessels are healed in four-and-twenty or six-and-thirty hours. We must, however, distinguish the cicatrization of the external tunic of veins from that of their internal membrane: the former, when it is divided, unites in the same manner as wounds of the cellular tissue; but this is not the case with the adherence of the internal membrane: it takes place more remotely and with more difficulty, from inflammation less readily affecting this tissue. The cicatrix of solutions of continuity of the parietes of veins remains but weak for some time, and is easily torn. Twelve or twenty-four hours after blood-letting, we can, by slight percussion or by distension, destroy the union that has been effected. It is even by these that the adhesive inflammation is changed into the suppurative, and is propagated to a greater or less extent in the cavity of the veins, and sometimes to the heart.

"John Hunter, however, considered the adhesive inflammation of veins as a mean of arresting the progress of the inflammation; and he says, that, by compression excited on the sides of the veins, we may cause them to adhere, and limit the extent of the disease, by preventing the pus formed below the adherence extending further towards the heart. Mr. Travers believes, on the contrary, that this adhesive inflammation is rare in veins, that a considerable degree of irritation is necessary to provoke it, and that, when inflammation is developed, it passes rapidly to suppuration; or else, that a large quantity of coagulable lymph is effused into the vessel, which fills up its calibre, obliterates it, and at length becomes adherent to its parietes: but here there is, properly speaking,

only adhesive inflammation, only that there should not be so abundant an effusion of coagulable lymph.

"The little disposition to adhesive inflammation, offered by the internal membrane of veins, seems to oppose the analogy that has been supposed to exist between that and the serous tissue.

"2°. *Suppurative inflammation.*—It is very common in veins: the greater part of the observations that we have referred to, demonstrate its existence. This species of inflammation has a great disposition to extend further and further on the affected surfaces, and the pus mingled with the blood in its circulation, with the continuity of the tissues, is a powerful agent in its propagation. It is in these circumstances that the general phenomena assume their severity of character, and that the state of the patient becomes calculated to excite the most serious alarm. If the inflammation diminish, the pus, from ichorous, serous, or white and consistent, as it had been, is changed for an albuminous fluid, and secondary adherence or obliteration of the vessel is the consequence.

"3°. *Ulcerative inflammation.*—There are many authentic instances recorded of ulcerative inflammation of the veins. M. Portal mentions having found, in the body of a woman, an ulceration of the superior vena cava. Mr. Travers cites a case, where the internal jugular vein was obliterated by the pressure of a tumour situate on the right side of the trachea, and covering the large vessels. The patient, towards the termination of his existence, had voided blood mixed with pus, by the mouth and by the anus. On dissection of the parts after death, the tumour was found to contain gangrenous cellular membrane and blood in a state of putrefaction. The internal jugular vein was filled, to a certain extent, with a coagulum of blood; but below this there was an ulceration that had established a communication with the sac of the tumour, so that the blood which came from the head passed in part into the cyst; there was an ulceration also that had induced a communication of the cyst with the œsophagus, so that the contents of the tumour could pass into the intestinal canal.

"It has been frequently observed, that, if wounds of the veins have not united by the first intention, the suppuration

that is formed, either in the tunics of the vessel or in the adjacent tissues, was soon accompanied with inflammation of the edges of the wound; that the opening gradually increased in size; and that it was not rare to see the whole circumference of the vessel destroyed by this vessel, and the continuity of its canal cease to exist, by the progress of the ulceration. Lastly, many instances of ulceration of the internal membrane of veins have been observed, but without the perforation of the whole thickness of the parietes of the vessels.

"4°. *Gangrenous inflammation.*—The frequency of suppuration of veins leads to a belief that gangrene might readily affect these vessels: observation, however, demonstrates the contrary. The veins and arteries long resist the effects of the gangrene which destroys all the tissues in the midst of which they may be situated. These vessels are, however, not in a healthy state; inflammation has seized them, and an abundant quantity of albuminous matter, mingled with a little blood, fills them, obliterates the canal for a greater or less extent, and thus opposes the occurrence of hæmorrhage. At length, the vessels, isolated on all sides by the destruction of the other tissues, and no longer receiving nourishment, die by a sort of inanition; a process is set up in some point, but always below the termination of the coagulum; the part of the vessel despoiled of its adjacent parts is separated; and this inflammatory process, by which parts deprived of life are separated from others, is that which I term, after M. Dupuytren, the *eliminatory inflammation.*

"5°. *The eliminatory inflammation.*—When a ligature has been placed on a vein or an artery, it is by this eliminatory inflammation that the vessel is separated throughout the whole thickness of the line embraced by the ligature, by which this is also detached, and by which a portion of the vessel forms a real eschar. In an artery, if the ligature be not too large and is properly applied, a moderate degree of inflammation affects the vessel above and below it. A slight effusion of coagulable lymph takes place on its internal membrane, and adhesion by the first intention is the result; a coagulum of a conical figure, albuminous at its base and sanguineous at its summit, is found, near the adherence of the

sides of the vessel, to oppose the effort of the blood; and, by eliminatory inflammation, the artery is gradually destroyed in the point correspondent to the ligature, which at length is detached. This happens from the tenth to the fifteenth day, if the vessel alone has been comprised in the fold of the thread, whatever may be its nature; but this is longer in taking place, if the thread does not act immediately on the vessel, and if it comprehends fibrous parts. The coagulum is not adherent to the internal membrane in the first few days; but, by an inflammation that takes place in the tissues of the vessel, it terminates by forming an adhesion.

"If any cause opposes itself to the union of the vascular parietes in the points adjacent to the ligature, and when the coagulum is not yet adherent, hæmorrhage may occur; and, if a ligature of reserve be employed, we easily divide the whole of the parietes of the artery in a point where the coagulum does not occupy the whole calibre of the vessel, and where it consequently cannot adhere to the internal membrane. This section of the arterial parietes by a ligature of reserve, is effected more promptly in proportion as the inflammation has made the tissues of the artery lose their resistance, and permit themselves to be divided like parts affected with the sebaceous degenerescence. These observations on the mode of resistance of inflamed tissues, and on the true causes of consecutive hæmorrhages, appertain to M. Dupuytren. I have often had occasion to verify their justness and importance.

"If an hæmorrhage happens a short time after a ligature has been placed on an artery, it is not immediately above the first that a second should be applied, but on a distant point, where the arterial parietes are not inflamed. Has a large ligature been applied on an artery? The section of the vascular parietes has not been effected, and union by the first intention is not effected; it is the suppurative and ulcerative inflammation that then ensues; and, when the whole thickness of the vessel has been destroyed by this process, hæmorrhage is the consequence.

"It is not exactly thus with respect to the veins. Adhesive inflammation being excited with more difficulty in these vessels, and their internal membrane not offering the same faci-

lity of division as that of arteries, adhesion by the first intention does not take place, or only with great difficulty. The facility with which the tissues of veins are distended with blood, is another unfavourable circumstance to the primitive union. A more powerful and a more durable irritation is necessary to induce inflammation of veins. Albuminous matter alone is secreted if the inflammation be moderate, or else to this secretion is joined the formation of pus if the inflammation be intense. When the inflammation extends on one of the surfaces of the vessel, either from the force of the irritation that has acted on it, or because the pus has circulated in the part of the vein which is between the ligature and the heart; it is, without doubt, to this propagation of the inflammation, that the development of general symptoms, the severity of the disease, and often the death of the subject, is to be attributed.

"The part of the vein situate near the ligature inflames; the membranes of the vessel acquire an inordinate thickness; the canal of the vein is filled up, and to a great extent, with a concrete albuminous matter, which soon adheres to the vascular parietes, and renders the vein impervious to the blood. The ulcerative and eliminatory inflammation then divide the whole thickness of the vessel in the circular line embraced by the ligature.

"*The treatment.*—It should be directed by the same principles as that of other inflammations. We should first endeavour to ascertain its cause; and, if it has happened after venesection, determine whether or not the instrument has been broken, and the point of it left in the parietes of the vessel.

"When the inflammation is solely local, we have been advised to put a stop to it suddenly, in its commencement, by cold lotions or fomentations,—as ice and saturnine applications. When the disease is more advanced, it should be combatted by the application of leeches on the course of the affected vessel; relaxing fomentations; emollient cataplasms; oily and mucilaginous unguents; tepid baths; camphorated, opiate, and narcotic, topics.

"J. Hunter, Reil, and Mr. Abernethy, think that we

should, and that we may, incite adhesive inflammation above and below the part affected, to oppose the extension of the disease, and prevent its extending further and further up the venous trunks, and to the heart itself. This adhesion would also prevent the pus, circulating with the blood, from irritating the internal membrane of the vessel over which it might flow. From what I previously said, it will appear that we cannot depend on the effects of compression in exciting this adhesion, because it is very difficult to obtain adhesive inflammation in the veins.

"A more certain mean would be to cut the affected vein through transversely, at a certain distance from the seat of the disease, to break the continuity of the tissues, and thus oppose the propagation of the inflammation. We may conceive that this operation is practicable only in cases where the affected vein is not very large in calibre, readily accessible to instruments, and when we need not fear the wounding of an artery or an important nerve.

"Prudence requires that, in the operation of phlebotomy, we always endeavour to obtain union by the first intention of all the different parts interested; and, if new emissions of blood are desired a short time after the first, that we do not destroy the process of primitive cicatrization to obtain blood by the same opening, but that we make another in a second part, and, if it be possible, in a different vein.

"If the inflammation has terminated by suppuration, we should, without delay, open the abscess to obtain a free course for the evacuation of the purulent matter.

"Lastly, if general symptoms appear, and they are intense, we should combat them by all the means directed for the treatment of angeio-tenique (inflammatory) fever and the phlegmasiæ."—*Journal comp. du Dict. des Sciences Medicales*, tome iii.

Practical Observations on the Action of Morbid Sympathies, as included in the Pathology of certain Diseases; in a Series of Letters to his Son, on his leaving the University of Edinburgh, in the Year 1809. By ANDREW WILSON, M. D. Kelso. One vol. octavo, pp. 407. London, 1818.

[From the Medico-Chirurgical Journal, for January, 1819.]

IN various parts of this Journal, but particularly in our review of Dr. Parry's Elements of Pathology, we took occasion to protest against the present rage for tracing diseases almost exclusively to *vascular* derangement, and overlooking the morbid movements or state of the *nervous* system. The longer we live, the more we see, and the deeper we study, so much the more are we convinced that, not only are the *primary impressions* of morbific causes sustained by the *sentient* system of the human fabric, but that it is in *this* system the primary morbid *movements* first begin, and are thence propagated to the *vascular* system; which, from that moment, reacts upon, and is again influenced by, the nervous system. We never shall have a sound pathology or successful practice, while any one of these two systems is studied in preference to the other; or, while they are considered as unlinked in perpetual reciprocity of action. Under this conviction, we shall give every possible publicity to the labours of those observers of Nature, who are exploring this interesting subject; and we could not have a better opportunity than in the analysis of Dr. Wilson's volume —a work which is characterized by deep thought, solid judgment, and accurate observation.

Dr. W. justly observes, that the laws of morbid sympathies are often very demonstrable to the senses, "and may be reasoned on in diagnostics with the utmost propriety, and considered as steady principles to be acted upon." Page 7.

"We know, for instance, that certain irritating matter contained in the stomach, will very commonly produce a headache; but knowing also the universal influence which the stomach exercises over the whole human frame, if a person becomes affected with pain, &c. in a distant part of the body,

in a limb for instance, without any occasional cause having been applied, attended at the same time, with certain signs of a loaded stomach, reasoning from the above facts, we readily believe, that if irritation in the stomach can produce pain in the forehead, it may, at any other time, produce pain in any other distant part also. It is a fair enough inference, therefore, that in this case likewise, the primary disease is seated in the stomach, and is a cause of pain in the limb by an act of morbid sympathy." Page 8.

The brain and its appendages, indeed, being the medium through which the living principle acts upon the otherwise inert organic structure, as also the medium through which the mind is made conscious of injurious applications offered to any part of the machine, it may properly be said that every part of the human body is capable of sympathising with the rest; because we see that no part of it can admit of having the sense of feeling excited to the height of pain, without the whole frame being deranged in sensibility. There are, however, specific sympathies, which are so common in their occurrence, as to be noticed as things of course; as, for instance, the gastro-cerebral, the cutaneo-gastric, and the utero-gastric sympathies.

These morbid sympathetic impressions on distant organs or parts are sometimes attended with pain, and sometimes not. In the *latter* case, the original irritation only increases or decreases the excitement in the sympathising structure. Thus we see the *vascular* system sometimes thrown into *inordinate* action by acrimonious irritation in the alimentary canal; at other times, the action of the heart is almost suspended by the application of offensive substances to the nerves of the stomach. But when the sympathetic irritation arises to the degree of *spasm*, which, in fact, is only the highest degree of contractile action in a muscular or fibrous structure, then we have *pain*.

"Wherever, therefore, muscular fibres exist, morbid spasm may also exist; consequently, not only the fibres of large muscles, but the smallest fibrous threads of all the membranous parts, are also susceptible of spasm from irritation, applied either directly or indirectly from morbid sympathy.

"It is further to be observed, that although the most violent

spasms of large muscles are seldom, if ever, succeeded by local inflammation, as is instanced in epilepsy, hysteria, &c.; yet, when the muscular texture of a membrane becomes the seat of a sympathetic spasm, *local inflammation of that membrane is speedily induced, the coats of its capillary vessels being probably also soon included in the sympathetic influence.*" P. 22.

This is an important doctrine, which is ever to be borne in mind by those who separate spasm from inflammation, and never dream of the *latter* when they have to combat the former.

With regard to the vinculum, as Dr. W. justly observes, connecting the sympathising part with that where the irritation is applied, we remain totally in the dark; and therefore, all we have in our power on this point is, by careful observation, to mark demonstrable facts; and these, by candid induction, ought to lead to correct practice.

The extensive influence which a healthy or diseased state of the digestive organs, and of the stomach in particular, exercises over the whole human frame, mental and corporeal, has long been, and still continues to be, the subject of observation and wonder among pathologists. When, indeed, we consider that the mucous membrane, stretching from the mouth to the anus, and lining so many important hollow viscera, is a secreting surface, studded with innumerable nervous or sentient papillæ, and exposed daily to a mass of heterogeneous and stimulating matters, as well what is poured in, in the shape of food and drink, as poured forth from the mucous glands themselves, in the shape of morbid secretion, it is not to be wondered at that the primæ viæ are the seat of most of those primary irritations which are productive of disease. The morbid sympathies which subsist between the stomach and various distant parts are doubtless reciprocal; but those which radiate *from* the gastric centre, would appear to be more powerful than those which are propagated from distant parts to it. It must also be remembered, as was hinted before, that irritation in the fibrous structures of the membranes lining the hollow viscera, and entering into the composition of joints, &c. will induce, first, spasmodic action; and whenever *this* arrives at a certain height, inflammation in the structures under conside-

ration. This local inflammatory movement will soon draw the heart and vascular system into increased action, by morbid sympathy—and thus a febrile state is induced. The following passage from Dr. Wilson depicts precisely our own sentiments, and accords with our own practice and experience.

"In fact, the operation of the *laws of sympathy*, through the nervous influence on the living system, is a thing demonstrable to the senses; and any theories which I have ventured to offer on their pathology, are very nearly as much so, to an unbiassed mind. At least, this I will assert for myself; that to my conception, they approach far nearer to the certainty of demonstration, than any other pathology I have met with on the same subjects, and have served to *direct my own practice*, in a satisfactory manner through a mist of insulated facts and general assertions; while every additional year's experience has served more and more to strengthen my opinions." P. 36.

We believe that Darwin, the great father of the sympathetic doctrines of modern times, was the most *successful* practitioner that England or the world ever produced. There was scarcely a town on the Continent of Europe from whence he was not consulted, either personally or by letter; and we have it from good authority, that his success was mainly owing to the *multiplied resources* which the sympathetic views of disease opened out to him. In our own practice, for many years past, we have had *solid* reasons for pursuing the doctrines and practices of Darwin; and we seriously recommend them to the rising generation, who are not yet so blinded by prejudice or pride, as to be beyond the reception of any thing in the shape of advice from others.

In the fourth Letter, our author enters on the consideration of febrile diseases. He considers that "a permanently increased action of the heart and arteries" is a *sine qua non* in fever, no other phenomenon being invariably present. We think, however, that a *deranged action* of the heart and arteries is a more permanent symptom in fever than an *increased* action; but we shall not cavil about definitions. It is of more consequence to bear in mind that this increased [deranged] action of the heart and arteries may arise

"From irritation, applied to the nerves of some distant part

of the body, between which and the vascular system a primary affinity subsists, exciting that system into violent action by morbid sympathy; or from the effects of something of an irritating nature having been received into, and circulating with the blood, and thereby directly applied to the internal surface of the heart and blood-vessels themselves. But the establishment of a febrile state of the system, as derived from remote causes within the body, appears very demonstrably to acknowledge the following primary distinctions:

"1st. As derived from the effects of acrid matter applied to some department of the nervous system, and exciting a morbid action of the heart and arteries by morbid sympathy; but such a remote cause, experience shows, is most commonly seated in the digestive organ.

"2d. As derived from the effects of irritation, arising from organic obstruction, somewhere existing in the body, and exciting increased action of the heart and arteries, by morbid sympathy.

"3d. As derived from the effects of something of an irritating nature received into, and circulated with the blood.

"4th. As derived from passions of the mind, exciting an increased action of the vascular system, by morbid sympathy.

"5th. As derived from two or more of these primary causes of fever acting at the same time." P. 43.

Our author candidly acknowledges, that we are totally ignorant why gastric irritation should in one person excite the vascular system, and in another the voluntary muscular system; but we are certain that such is the fact. Dr. W. then proceeds to the consideration of gastric fever, as the most common, and at the same time, the most simple form of fever. He considers the irritation in the stomach as propagated, by morbid sympathy, to the heart and arteries. In this species of fever, the first signs of any departure from health are of that kind which point out impaired action and morbid irritation in the digestive organs, as is evinced by the precursory phenomena of diminished appetite; weight at the præcordia; abdominal distension; thirst; parched mouth, and furred tongue. To these are commonly added, signs of impaired and irregular action in the nervous system, arising from morbid sympathies with

the primæ viæ; such as languor, disturbed sleep, head-ache, dry skin, flushings and chills. This is the prevailing fever of infantile years; and, if taken in time, may soon be checked, merely by the ejection of the source of irritation from the primæ viæ; another proof of the truth of the doctrine in question.

The two great indications then in gastric fever are, the evacuation of the morbid secretions from the line of the alimentary canal, and the reduction of morbid temperature on the surface. Dr. W. here takes occasion to object to the unreasonable prejudice which has lately existed against emetics in this country, chiefly engendered, we conceive, by their deleterious effects in the hotter regions of the earth, where the gastric and biliary systems are ordinarily in a state of irritability, which is greatly exasperated in the fevers of those climates, and of course where emetics are improper. But in this country it is very different, and physicians lose a powerful febrifuge by the disuse of emetic tartar in particular.

"Nor are antimonial emetics attended by any hazard, nor even by more severe nausea than ipecacuan, unless it happens by an over-dose, or by mismanagement during its operation. One grain of ant. tart. for an adult, will generally nauseate the stomach in half an hour; when, without waiting longer, the stomach should be distended by drinking warm water, and vomiting is promoted by irritating the fauces a little with a feather. One half-glass of wine after every fit of vomiting will assist its operation." "It is by a prudent and free administration, then, of antimonial emetics, along with mercurial laxatives, assisted by the neutral salts, that the first and great indication of cure is here to be accomplished." Page 60.

The Doctor takes this opportunity of expressing his opinion, that the *debility* in these fevers is only apparent, not real; and of course, to be removed or prevented by evacuations, which take off the load from the spring of life. He justly remarks, that mere *aperients* will not do; but that "very free evacuations are always necessary, procured by the help of the most active *purgatives*, administered in appropriate doses; remarking the nature of what comes off, till it puts on a healthy ap-

pearance, a circumstance which usually attends a solution of the fever, with its accompanying train of symptoms." P. 62.

Our author next turns to the consideration of fever, as dependent on "idiopathic organic obstruction;" viz. topical inflammations, from whatever occasional source they may be derived, as local stimuli, wounds, bruises, &c.

"The application of excessive cold, or of burning heat, &c. forming obstructions in the capillary vessels of the vascular system, and exhibiting what is designed local inflammation; from whence, by a sympathetic affinity, the heart and arteries are drawn into violent action, and it thereby becomes a primary cause of fever." P. 71.

After some ingenious remarks on the nature of the topical inflammation itself, in which he concludes that the obstruction to the free stream of blood is seated in the capillary extremities of the veins, our author observes, that with respect to the *treatment* of fever in these cases,—

"Large and general bleedings, as also topical bleeding, whenever it can be applied, are perhaps the most powerful means; and along with these, aperient medicines. But, whenever an acting morbid cause is observed to exist in the digestive organs, a free discharge from these, *by the most active evacuants*, is a measure of great importance, from the mutual sympathy betwixt the stomach and every part of the body. As to external applications, I have always observed tepid fomentations to be the most useful, and the most soothing to the patient's feelings." P. 80.

The ratio symptomatum and pathology of typhus are next descanted on by our author, with much ingenuity and acuteness; and although we cannot agree with him on all points here, particularly in his opinion that the gastric and biliary secretions are greatly *increased* at the beginning of typhus, yet his doctrines all tend to support the propriety of the depletory or anti-stimulant plan of treatment, now superseding the Brunonian mania. Dr. W. believes, and we unite our suffrage to his, that cinchona stops the paroxysms of an ague, not through the medium of the circulation, but by its tonic, and perhaps sedative effects on the nerves of the stomach. Indeed, it is only

in this way that the salutary operation of several other remedies in intermittent fever can be accounted for.

In respect to our author's *methodus medendi*, we think it is not quite energetic enough; though, probably, in the part where he resides, and where fevers are not likely to assume the graver types, the practice may be good enough.

Dr. Wilson's long chain of reasoning on influenza we must pass over, in order to pay some attention to his opinions on acute rheumatism. Here the sceptics of the day will be ready to say, that Dr. W. far outstrips our illustrious London pathologist, Mr. Abernethy, in attributing a variety of diseases to derangement of the *digestive organs*. Although we are not disposed to go the lengths of either Dr. W. or Mr. Abernethy, on this subject; yet, we are convinced, that there is much truth and justice in the doctrines of both these gentlemen.

"Acute rheumatism," says Dr. W., "in its progress, appears to include two stages of disease; the first of which is *gastric fever*, attended by a painful state of the membranes surrounding certain joints, excited by a spasmodic affection fixed on them, in consequence of morbid sympathy, with irritation in the primæ viæ. The second stage is formed by an inflamed state of these membranes, created by the continued action of the same sympathetic affinity; which inflammation is occasionally so considerable as to produce effusions into the cellular membrane, and even the bones of the articulation become sometimes inflamed, eventually giving rise to anchylosis, and other diseases of the joints." P. 221.

On these principles, Dr. Wilson employs liberal evacuations from the primæ viæ, especially by calomel and antimony; aided occasionally by the neutral salts, particularly the tartrite of potass, or phosphate of soda, "till the signs of a loaded state of the digestive organs shall disappear, or at least, shall have greatly abated. Anodynes, which have the effect of suspending spasm, and of procuring a state of rest, are useful from the beginning; but their usefulness is most eminent after the primary irritation is lessened." P. 223.

Our author employs bark and steel, when the febrile state is subsided. For the local inflammation he trusts principally to topical bleedings and fomentations, "a little more than blood

warm." He also recommends warm anodyne poultices, composed of the common forms, with opium or cicuta added. He is an advocate for calomel and opium in acute rheumatism.

From this disease, the transition to gout is easy. Our author not only supports the idea of a strong affinity between gout and rheumatism, but comes to the conclusion, that both diseases mainly depend on derangement in the digestive organs.

"In contemplating the above premises, it is obvious that there appears no other demonstrable cause of vascular excitement, but that which, by unequivocal signs, is shewn to exist in the digestive organs; therefore, this unavoidable conclusion is likewise obvious, that the febrile paroxysm, excited in the attack of a fit of gout, must be viewed as real gastric fever; and farther, that any other suppositious principle, as inherent in the system, but which is undemonstrable as a primary agent, or remote cause of the disease, may fairly be esteemed as imaginary."

This doctrine, indeed, is very little different from that inculcated in some of the latest and best works on gout. In respect to the treatment, Dr. W. justly observes, that over the predisposition or idiosyncrasy of the patient, medicine has little control; yet, many of the inordinate movements in gout may be soothed and moderated—"especially by evacuations from the stomach and bowels."—Dr. W. considers also, that such medicines as act upon the skin, are extremely beneficial; as the liq. ant. tart. and tinct. opii, accompanied with diluting drinks. The acetate of ammonia also, given in tepid drinks, is useful for the same purpose. In respect to local applications, "the tepid warmth of an emollient poultice, void of every kind of acrimony, is the most suitable; or, tepid emollient fomentations, covering the parts afterwards with warm flannel. To these may be added, topical bleeding with leeches." P. 334.

In the intervals of the paroxysms, Dr. W. recommends the greatest attention to the state of the stomach and bowels, particularly by laxative medicines.

"Of the last, calomel is the most efficient, and ought to form the chief basis of the measures taken for clearing the lower intestines, accompanied with the occasional use of some saline purge."

Emetics, he thinks, are valuable remedies in the remissions of the disease. He condemns the external application of cold, lest "some other organs, which may be next in sympathetic affinity with the seat of irritation, become affected with its influence; and if this shall happen to be any vital organ, the result may be fatal." P. 339.

Dr. W. next proceeds to draw a parallel between gout and erysipelas—a parallel which has been very fully drawn by the continental physicians, as lately translated by the Editor of this Journal. We shall quote the following case:

"A gentleman has had an ulcer on his leg for many years. Along with the ulcerated leg, he is, at the same time, subject to bilious accumulations in the primæ viæ; but these accumulations seldom occur without producing a febrile paroxysm, attended by extensive erysipelas around the ulcer; under the influence of which he has occasionally laboured for two weeks at a time, but without any medical aid, further than what he derived from some gentle aperient medicine to preserve his bowels soft. At last, when under one of these feverish fits, he was persuaded to take, though reluctantly, an antimonial emetic, and even to repeat it, followed with a mercurial laxative; by which means he threw off a great quantity of offensive bilious fluid, after which the inflammation and fever very quickly abated. Since this time, as the ulcer on his leg still remains, and continuing still subject to bilious complaints, he has become aware of the approaching illness; and being now convinced of the benefit attending this practice, he has, by seasonable evacuation, saved himself from many a fit of fever and erysipelas." P. 376.

Dr. W. observes, and wisely observes, that irritating matters, and consequently irritation, cannot be expected to be removed from the long line of the digestive organs by a few evacuations, whether of the emetic or cathartic class. Part of the offending matter will often lurk in the duodenum, or some of the sinuosities of the other intestines, while the ordinary discharges by the rectum are suffered to pass along. Additional morbid secretions may also be collected anew—

"Therefore the evacuations ought to be persevered in till the signs of irritation in the stomach shall disappear, and till

the discharges from the rectum shall assume a healthy aspect; otherwise, the portion of vitiated matter which is retained, will assuredly tend to prolong the disease, and disappoint expectations." P. 379.

Angina Pectoris. Dr. Wilson thinks that post mortem researches "have offered no certain information, nor discovered any organic disease within the thorax, which might be referred to as the direct cause of its symptoms." 382.—Here we cannot coincide with our author. The Histories and Dissections of Dr. Parry, and cases which have since been published, afford very satisfactory evidence, that all the symptoms of angina pectoris have *sometimes* resulted from ossification of the coronary arteries. We are ready to admit, however, that all the phenomena of syncope anginosa have *also* occurred, and terminated even in death, without any disease of structure being cognizable to the senses. This must lead all unbiassed minds to the conclusion, that it is sometimes a disease of structure, giving rise to periodical lesion of function—and at others, only a derangement of *function* in the respiratory and circulating organs, leaving no perceptible trace of its previous existence after the thread of life is snapped. In the latter cases, we can only suppose it to be of a spasmodic nature, resulting from arthritic or rheumatic irritation misplaced, and not yet amounting to ostensible organic change in any tissue or vessel. It is in this light that our author views it, and we shall present his ideas on the subject.

"In the course of my own experience, I have seen but a few cases of this kind; but from my observations on these few, I have uniformly discovered, that at the commencement of the disease, the digestive organs were in a loaded state; as also, from farther inquiry, that they had previously been so. But from considering the strong disposition to sympathetic action which subsists, in some individuals, betwixt these organs and the heart, as well as other organs within the thorax, together with a general review of the predominant symptoms, I cannot avoid drawing this inference, that angina pectoris is a disease which also arises from a morbid sympathy, with a primary cause, seated in the primæ viæ." P. 385.

With respect to the particular seat of the spasm, Dr. W.

thinks, that it is doubtless either in the heart itself, or the adjoining great blood-vessels, or perhaps in both at the same time; he also thinks, that from the fixed severe pain under the sternum, a little to the left side, and at times, quite across to the back, the mediastinum may be very materially included in the spasmodic affection, perhaps in a primary manner, as in arthritic or rheumatic translations. It is certain, indeed, that angina pectoris chiefly attacks those of a gouty or rheumatic character. We shall introduce an interesting case in elucidation.

"April 18th, 1777. Mrs. ——, aged 50 years, complains of an intolerably severe stricture extending quite across her breast, attended by a severe pain under the middle of the sternum, which communicates itself to both her arms in a violent manner, but confined to a spot about the middle of the humerus; accompanied with a feeling of suffocation, and a most irregular, soft, intermitting pulse. In this state she continues for the space of ten or fifteen minutes, when the symptoms gradually abate, and she feels free from any complaint, excepting weakness, her spirits being much exhausted. Her appetite for food is impaired; her tongue much furred, with thirst; bad taste in her mouth; weight at the præcordia, and restless nights; her pulse, excepting when under the fit, being natural. She is of a spare habit, and subject to atonic rheumatism in her arms and limbs, and has been repeatedly affected with violent periodical head-aches; she has been complaining in this way for some days. At first, the fits returned twice or thrice in the twenty-four hours, with unequal violence; but she feels them increasing in frequency as well as in violence, and now a recumbent posture is certain of producing them at any time.

"She had, on some former occasion, been alarmed by the severe operation of an emetic; and I found, at present, that her aversion to it could not, as yet, be conquered. I was on that account left to the effect of laxatives alone, for the purpose of clearing out her stomach and bowels. These were accompanied with opiates, and a blister on her breast. The first cathartic dose produced some bilious stools; and a repetition of it every morning, with a powerful opiate three times daily, had the effect of mitigating the violence of the disease for a

few days; after which it returned with increased violence, both in length and frequency of the fits, accompanied with faintness; her pulse was extremely confused, and she described her feelings of anguish as intolerable. She had now been out of bed for eight nights and days, because any attempt at a reclining posture was certain of producing a paroxysm; on which account she was compelled to spend the whole of her time in her chair, and, notwithstanding the opiates, she slept very little. I now at last prevailed on her to use an emetic of ant. tart. and she discharged a great quantity of acrid, bilious-coloured fluid. On the succeeding night she enjoyed more sleep, but still could not bear a lying posture. On the 27th the fits less severe, and less frequent; she continues the opiates; and on the 28th took a laxative dose. On the 29th relapsed, and took another emetic; threw up much bile, and was again relieved.

"May 2d, took another emetic yesterday, and has had no fit for twenty-four hours—can sleep in bed. May 4th, has had some slight returns yesterday, and repeated the emetic; discharged more offensive bilious fluid, and is better. May 10th, continues better; her tongue is clean, and other signs of a loaded stomach, &c. gone off. May 29th, has taken stomachic bitters, with the daily use of aperient pills; and by the help of moderate exercise, and restorative diet, remains quite well. She had afterwards repeated slighter attacks of the same complaints, which were always removed by a discharge of offensive matter from the intestinal canal, procured by the same means, and died at last of another disease in the year 1790." P. 390.

Finally, our author is convinced, from a careful attention to the phenomena of croup, that the primary seat of irritation is in the digestive organs, whence is generated, by morbid sympathy, a spasmodic affection of the glottis, ending in inflammation of the mucous membrane of the larynx and trachea, ultimately destroying the action of the lungs, by rendering them impervious. Acting from these premises, Dr. Wilson asserts, that our great indication is to clear the stomach and alimentary canal, as early as possible, by emetics and mercurial cathartics.

"Indeed, I believe these medicines to be the most efficient

means hitherto known of speedily and effectually accomplishing, on any occasion, this important object." P. 409.

This plan will often, he thinks, check the disease in its nascent movements, and before actual inflammation has commenced; but we believe that such nascent movements, or in other words, the *spasmodic* stage, is rarely witnessed by medical men; and consequently, it is against the inflammation and exudation from the surface of the mucous membrane that we have principally to guard. Hence, while we take every opportunity of acting on the alimentary canal by emetics and calomel, we must detract blood from the throat, and counter-irritate in the neighbourhood, with all possible expedition and energy.

We have now presented a full analysis of Dr. Wilson's work. Its greatest fault, or more correctly speaking, its misfortune, is the diffuseness of the style. In one fourth part of the space, he might have given the same matter in an infinitely stronger point of view. Indeed, *medical economy* in medical literature is too much neglected. We are fully convinced, that the man who endeavours to diffuse professional knowledge on the easiest terms will, in the end, be the greatest benefactor to medical society. The higher classes have not time to peruse, and the inferior orders have not money to purchase voluminous publications; and hence the stream of science flows in narrow and extremely confined channels. We could illustrate this fact by anecdotes which would be scarcely credited by the well-informed members of the profession, but which are strictly true. We were lately in conversation with one of the first rate medical practitioners in the greatest city of the world, who neither knew the name nor any part of the writings of one of the greatest ornaments of medical science at the present period! It would be equally mortifying and discouraging to the really zealous cultivators of medical science, if they knew the narrow limits in which their labours move. It is true, that medical works take a large *circuit*, in consequence of medical clubs and societies; but the *actual readers* are few indeed!

This, in some degree, is owing to the expansion of little matter into large space, and to the consequent expense of purchase; so that, generally speaking, medical writings are little known, excepting through the medium of Journals.

But to return. The doctrine of morbid sympathy has, in Dr. Wilson, received a strong support and confirmati n. Our readers are aware, that the leading points of our author's doctrines and opinions have been delineated lately in another publication, and the coincidence of ideas is a strong proof of the solid foundation on which the doctrines stand. We hope that Dr. Wilson will, in a future edition, compress the matter into less space, and adopt a more precise and philosophical style. There are some inaccuracies of language in the present work; but still it is a very valuable publication, and does infinite honour to its author.

An Essay on the Diseases of the Excreting Parts of the Lachrymal Organs. By WILLIAM MAC KENZIE, Member of the Royal College of Surgeons, of the Medical and Chirurgical Society of London, and Lecturer on the Anatomy and Surgery of the Eye. 8vo. pp. 95. London, Anderson and Chase. 1819.

[From the London Medical and Physical Journal, for August, 1819.]

THIS essay constitutes an addition to our medical literature of considerable value: the subject of it is particularly interesting, and is by no means well understood by the generality of English surgeons. Under the term fistula lachrymalis, various forms of disease have been comprised, differing in their origin, nature, and in the treatment they require; and, as is ordinarily the case, a want of accuracy and precision in the definition of these maladies, has been attended with a want of due discrimination in the measures employed for their relief. The German surgeons excel, on many occasions, in nice discrimination of the various forms of disease which may occur in particular organs, and especially in those affecting the eye, and parts subservient to it. To supply in part the deficiency of information in our language on this point, is the intention of the present work; and it is an object which Mr. Mac Kenzie is well qualified to effect, both from his literary researches,

and his opportunities for personal observation, during a residence for some time in Germany, and especially his experience under the tuition of Professor Beer, of Vienna. Yet Mr. Mac Kenzie is not to be considered in this instance merely as an imitator: he has differed, in some respects, in his arrangement of the subjects of the present essay from Professors Beer and Schmidt, whom he chiefly follows; and advances some original observations of practical utility.

The author distinguishes the diseases of the excreting parts of the lachrymal organs into the following varieties: I. *Wounds of the lachrymal canals.* II. *Erysipelatous inflammation of the parts covering the lachrymal sac.* III. *Acute inflammation of the excreting parts of the lachrymal organs.* IV. *Chronic blenorrhœa of the excreting parts of the lachrymal organs.* V. *Stillicidium lachrymarum.* VI. *Fistula of the lachrymal sac.* VII. *Caries of the os unguis.* VIII. *Relaxation of the lachrymal sac.* IX. *Mucocele of the lachrymal sac.* X. *Obstruction of the lachrymal canals.* XI. *Obstruction of the nasal duct.*

This arrangement is not, we consider, wholly free from objections. Fistula of the sac is always a consequence of some of the other forms of disease above-mentioned, and may accompany nearly the whole of them; it must also vary in its character, according to the causes on which it depends, and requires a relative diversity in the measures for its cure: it would, therefore, probably have been more properly treated of in connexion with the diseases which it may accompany, than in an isolated manner. The comprising of caries of the os unguis amongst the diseases of the excreting parts of the lachrymal organs, is not quite correct. We are also not perfectly satisfied with the making a distinct variety of relaxation of the lachrymal sac; but, on turning to the work of Prof. Beer* on Diseases of the Eye, we find that he also considers it in a distinct manner, under the appellation of hernia of the lachrymal sac, which must be considered as high authority in support of its propriety; although Prof. Beer, as well as Mr. Mac Kenzie, describes it to be a consequence of previous excessive disten-

* *Lehre von den Augenkrankheiten, als Leitfaden zu seinen Oeffentlichen Vorlesungen.* Von George J. Beer. Wien. 1817.

tion of the sac from collection of mucus, &c. in that organ, from either acute or chronic inflammation of its lining membrane. A similar objection may be made to the consideration of stillicidium lachrymarum as a variety of disease, regarding it in its connexion with a morbid state of the *excreting* parts of the lachrymal organs. With those exceptions, we consider the arrangements adopted by Mr. Mac Kenzie as systematically proper, and calculated to be of considerable utility in its application in the practice of surgery. A rapid view of the work will render this evident.

We pass over the first section, since it contains no pathological observations of important novelty, nor any therapeutical precepts not indicated by the general principles of surgery.

In the *erysipelatous inflammation of the parts covering the lachrymal sac*, the appearance of the integuments is similar to that produced by erysipelas in other parts of the body. The irritation extending to the papillæ lachrymales, causes a contraction of their orifices, and a collection of the tears in the nasal angle of the eye; and, when the inflammation is more severe, affecting the lachrymal sac, nasal duct, and canals, the papillæ become so contracted, that the puncta are completely closed; "the nostril upon the side affected is dry, and so uncommonly sensible, that the slightest irritation of the schneiderian membrane causes violent sneezing." These accidents generally disappear when the inflammation of the integuments subsides; but, the author continues to observe,

"If the lachrymal canals have participated more than common in the disease, the re-absorption of the tears does not take place immediately upon the inflammation subsiding. On the contrary, a stillicidium lachrymarum continues, when all the other symptoms have disappeared.

"If the inflammation is severe, and extends beneath the integuments, the lachrymal sac, at the commencement of the second stage, becomes completely filled with mucus, which can always be discharged by pressure. At the same time, the erysipelas ends in a real process of suppuration; the subcutaneous cellular substance becomes disorganized in order to make room for the matter of an abscess: this matter collects between the integuments and the orbicularis palpebrarum;

sometimes it makes its wa between the fibres of that muscle, penetrates the fibrous layer by which the sac is immediately covered, and comes into contact with the anterior part of the sac, which is already distended by the presence of an inordinate quantity of mucus. At last, the integuments give way in one or more points, and the abscess is discharged. The appearance of the parts is now apt to impose upon a superficial observer. There is the tumor of the sac; there is the fistulous opening of the integuments. He probably pronounces the case to be a fistula lachrymalis, and forthwith opens the sac.

"Let us distinguish this case from another to which it bears some resemblance, but with which it must by no means be confounded. It may happen that the purulent matter accumulated under the integuments has actually penetrated the anterior side of the sac, which thus comes to be filled with pus received from without; in the production of which its lining, or mucous membrane, has had no share. This latter case, which, for the sake of distinction, may be called spurious fistula of the lachrymal sac, must be carefully distinguished both from the former, in which the sac is entire though distended with mucus, and from those diseases hereafter to be described, in which the purulent matter that fills the sac is the result of inflammation of the lining membrane of the sac itself."

We have indulged in the foregoing extensive transcription, because it furnishes a good specimen of the author's accuracy of observance, and will show the importance of precise pathological knowledge in the treatment of the disease.

Some observations on the causes, prognosis, and the general and local treatment, follow; from which we adduce an extract, that, with the preceding account, will convey rather a comprehensive view of the most important part of this section of the work.

"At the commencement of the suppurative stage, the patient must first of all be placed in a warm and dry atmosphere. A dry linen compress ought to be laid upon the affected integuments. Gentle diaphoretics ought to be given. If the symptoms indicate the formation of a subcutaneous abscess, a warm poultice of bread and milk ought to be applied. Still, we must not leave the matter of the abscess to make a way for

itself through the integuments; but, as soon as even indistinct fluctuation is perceived, we must open the abscess with the lancet, in order to save the lachrymal sac, and prevent the formation of a spurious fistula.

"If we are not called till such a fistula has formed, let us beware of all unnecessary introduction of probes and syringes into the sac. By means of a small syringe, the fistula is to be washed out once a-day with tepid water, mixed with a little of the vinous tincture of opium. A small quantity of lint dipped in the same tincture, is then to be introduced into the abscess, but not pushed so deep as to enter the lachrymal sac. After the fistula has healed, the blenorrhœa which may remain is to be treated as shall be explained in the fourth chapter."

In the form of disease next considered, *acute inflammation of the excreting parts of the lachrymal organs*, the primary seat of the malady is the mucous membrane of the whole of the excretory parts of the lachrymal organs; this is accompanied with

"Obtuse, deep-seated pain, extending to the nose, and even to the eye-ball; a swelling appears in the situation of the lachrymal sac, having the shape of a bean, accurately circumscribed, hard, very sensible to the touch, and affected with stinging pain whenever it is pressed. This swelling becomes gradually red, at last extremely red, and then the least touch is insupportable. The papillæ are shrunk; the puncta are scarcely visible; the absorption and conveyance of the tears into the lachrymal sac, and through the nasal duct into the nose, are completely stopped; and a stillicidium, or discharge of tears and mucus, takes place from the nasal angle of the eye. The nostril on the affected side is at first uncommonly moist, but it soon becomes dry, the inflammation extending to the mucous membrane of the nose. The inflammation affects the caruncula lachrymalis and the conjunctiva, spreading also to the orbicularis palpebrarum, and to the integuments of the lower eyelid. The redness about the nasal angle of the eye, with some degree of swelling even to the cheek, gives to the parts, when viewed at a distance, an appearance as if the integuments were attacked by erysipelas; but, on a nearer examination, the peculiar redness, and all the other characteristics of phlegmonous

inflammation, are recognized; and, in the midst of the diffused discoloration and tumefaction, the circumscribed swelling of the lachrymal sac is evident, not merely to the touch, but even to the view."

The author traces the progress and consequences of this affection in a very lucid and satisfactory manner: the most frequent results, when the inflammation has been severe, are thickening of the mucous membrane of the whole organ, and obstruction of the canals and nasal duct. The abundant secretion of mucus, being collected, distends the sac, induces inflammation and consequent rupture of its paries, and the matter is evacuated externally through the fibres of the orbicularis palpebrarum muscle and the common integuments: the consequence of this is the fistulous opening, described more particularly and distinctly in the fifth section of this essay. Sometimes, even after this accident, the natural passage of the tears is spontaneously re-established, and the opening in the paries of the sac will heal. The latter occurrence may also happen whilst the nasal duct alone remains impervious; when the patient is obliged, several times a-day, to press upon the sac to evacuate its contents. If the wound be permitted to heal whilst the canals and duct are both obstructed, the natural secretion of mucus going on will distend the sac, and induce the disease described in the ninth section under the term *mucocele*, by Mr. Mac Kenzie; or what is, not so appropriately, called dropsy of the sac by Prof. Beer.

A more mild degree of inflammation, or irritation, of the same parts, constitutes the next variety, *chronic blenorrhœa of the excreting parts of the lachrymal organs*. This is the most common of the diseases described in this essay, and is treated by the author in rather an extensive manner. The various causes, constitutional and local, from which it arises, and the consequent diversity in its character and the treatment required for it, render it impossible to convey much information respecting it in an abstract. A bean-shaped tumour, from distention of the sac, and a discharge of puriform mucus through the puncta, for the canals are not obstructed, are the most usual symptoms. Persons of a scrofulous habit are most frequently the subjects of it; and it is usually particularly troublesome, or

solely attacks the patient, during cold and wet weather. The more severe consequences of it are fistula, from attacks of acute inflammation ending in suppuration; induration of the organ; and permanent obliteration of its canals. The obstruction of the nasal duct, in the first instance, merely depends on the tumefaction of its mucous membrane.

This affection is ordinarily much mismanaged by practitioners in general, from a want of correct knowledge of its real nature.

Stillicidium lachrymarum is properly distinguished from *epiphora*; the former depending on obstruction of the excretory parts of the lachrymal organs, the latter on increased secretion of the tears; and, in the former point of view, cannot with propriety be considered as a form of disease.

In the section on *fistula of the lachrymal sac*, the author describes, in a particular manner, the different varieties of ulcers connected with the paries of that organ, and the appropriate mode of treatment under the various circumstances in which they appear.

From the chapter on *caries of the os unguis*, we must transcribe the following passage; it describes what we believe is frequently too true.

"The idea of the frequency of caries of this bone, which, notwithstanding the testimony of Sharp and Janin, has continued to prevail, appears to be founded chiefly upon the mismanaging treatment of surgeons themselves; and, above all, is to be attributed to their rude examination of the parts with probes and other instruments. A patient presents himself with fistula of the lachrymal sac; the idea of caries starts up in the surgeon's mind, and he forthwith takes a probe in order to examine whether there is caries or not; he penetrates the posterior part of the lachrymal sac, touches the bone with the point of the instrument, which he moves about to this side and to that, in order to make himself sure of what he is seeking for; and at last, distinctly feeling the bone, which he has denuded, he pronounces the os unguis to be carious."

Caries of the bone but rarely happens, except from fistulous ulcers of the sac, syphilis, and scrofula; and is, consequently, not a subject for any important measures of expressly local treatment.

The *relaxation of the lachrymal sac*, is a consequence of its over-distention by collected mucous or puriform matter, in the disease described in the third and fourth sections, which has destroyed its natural contractility; and it becomes distended by its own mucus, often still secreted in preternatural quantity, and the tears collected in it, into a bean-shaped tumor. The integuments covering it are scarcely or not at all discoloured; it is not painful, it yields easily to the pressure of the finger, and never exceeds the size of a common horse-bean. Its contents are discharged by pressure, either by the canals or the nasal duct, according to the direction in which the force is applied.

"The treatment consists in the use of two distinct means, each of which, as may be seen by the testimony of Pellier and others, is, when used alone, apt to fail.*

"The first is the compression of the sac; and here let it be observed that the present is the only case in which compression of the sac is useful. In any other disease of that part, this practice would produce the most destructive effects. The compression must be carefully applied, constantly continued, and gradually increased. Machines have been invented for this purpose, but they never fulfil with precision all these conditions. We cannot, by such an instrument as Sharp's or Petit's compressorium, the first invention of which we owe to Hieronymus Fabricius, keep up a regular and an increasing pressure: the compressing surface, upon the least occasion, especially during the night, is disarranged; and the patient is hindered from pursuing his business by the presence of such an apparatus. Graduated compresses, then, are to be preferred; over these a firm leather pad, of a proper form, is to be placed; and the whole is to be supported by a narrow roller passing round the head. In this manner, the pressure takes place exactly upon the part which ought to be acted upon; it can be daily increased; the pad cannot, even when the patient is very restless, be shoved aside; nor need such an apparatus prevent

* Pott—*Observations on the Fistula Lachrymalis.* Works. London, 1808. Vol. i. page 252.

Pellier de Quensy, *Cours d'Operations sur la Chirurgie des Yeux.* Paris, 1790. Tome ii. page 207.

him from following his ordinary employment, even out of doors.

"The second part of the treatment consists in the application of some astringent fluid, both to the external surface of the tumor, and to the internal surface of the relaxed sac. A great variety of astringents might be mentioned as proper for this purpose; such as the sulphate of iron or of copper in solution, an infusion of oak bark, or diluted alcohol. The graduated compresses are to be moistened twice or thrice daily with the astringent fluid which shall have been selected. A small quantity also of the same fluid is to be dropped into the lacus lachrymarum, and left to be absorbed by the puncta, the patient being laid in a horizontal position, and the compresses sometimes relaxed, but not removed.

"Such is the method of curing a disease, which I have shuddered to see treated by incision of the sac, and the passage of various instruments through the nasal duct; operations which are to be regarded as the more severe in such cases, because they are wholly unnecessary. As for the Anelian injections, the direct injury of the papillæ, and the over-distention and consequent atony of the puncta, so that they can no longer absorb the tears, are only some of the bad consequences of such a practice. Such injections in this particular case would be attended also by a momentary over-filling of the sac, which would be just undoing with the one hand what we were effecting with the other."

In the *mucocele of the lachrymal sac*, the tumor is accompanied with a purplish colour of the integuments, and it often attains the size of a pigeon's egg; it is very firm to the touch, and its contents cannot be evacuated by pressure, because the canals and ducts are both totally obstructed.

"The colour of the integuments in mucocele has led some authors to describe this disease under the name of varix of the lachrymal sac; and the hardness and size of the tumor, added to its colour, have frequently led those charlatans, who were formerly but too often intrusted with the care of the diseases of the eye, to extirpate the lachrymal sac affected with mucocele, under the idea that they were removing a cancerous tumor."

In the appropriate treatment of this important form of disease, the question is not whether the tumor only can be removed, for this can always be effected by laying open the sac, and turning out its contents: the important question is, whether or not the natural passages can be restored.

Obstruction of the lachrymal canals and *nasal duct*, are the affections best understood by the English and French surgeons, being those to which their attention has been chiefly directed in their views of the disease of the organ under consideration; yet the observations of Mr. Mac Kenzie on these subjects will be perused with advantage.

Our observations on this essay have occupied a much greater space than we usually devote to so small a work; but this has necessarily arisen from the very concise manner in which the author has himself treated the different subjects it embraces: he has effected this as closely as is consistent with perspicuity of pathological description and practical utility. This is a circumstance which will contribute much to favour the benefit that will ensue from his labours, by rendering general the possession of this work by practitioners of surgery. This is no unimportant merit, at a time when productions in medical literature are so numerous, and in general so expensive, as they are at the present period.

We hope to see Mr. Mac Kenzie pursue the course he has here commenced: there are many other points in the pathology of the eye, and the parts subservient to it, on which he might adduce some illustrations, both novel and important to English medical literature.

The Elements of Chemical Science. By JOHN GORHAM, M. D. Member of the American Academy, and Professor of Chemistry in Harvard University, Cambridge. *Homo naturæ minister et interpres.—Bacon.* Vol. I. pp. 556. Boston, Cummings & Hilliard, 1819.

[From the North American Review, for June, 1819.]

THE rapid improvements which have been made in the science of chemistry during the present century, have rendered

it almost impossible for any to keep pace with it in its discoveries and revolutions, except those who have made it a particular object of attention. Never before, probably, have the exertions of so many individuals of the highest capacities and most persevering industry been at once concentrated upon a single subject; or the zeal and ardour of the philosopher been so entirely seconded by liberality and patronage. Chemistry has been the most popular science of the age. The novelty and splendour of some of its discoveries, the almost magical effect produced by some of its operations, and the readiness with which it explains so many of the ordinary phenomena of nature, have served to attract and charm minds but little disposed to relish its deeper investigations. This was particularly the case, whilst the theory of Lavoisier continued to be received in the chemical world. Its beauty and simplicity, the facility with which it was explained and understood, and its almost perfect applicability in accounting for the operations of nature, recommended it to the attention of general observers, as well as of the philosophical inquirer. But the revolutions which in the course of a few years have been effected with regard to some of its most important principles, by rendering chemistry more complicated and abstruse, have lessened very much the fascinations which it formerly possessed. It is now no easy matter—such has been the progress of discovery—to comprehend perfectly the refined speculations of the science, or the new arrangements and relations which have been pointed out in the different forms of matter, by recent investigations. A tolerable knowledge of chemistry cannot now, as it could once, be obtained by attending a few lectures, performing a few experiments, and studying some short and familiar exposition of its principles. It has now assumed somewhat of a more repulsive appearance. Such indeed are the changes which have taken place, that those elementary works which were in common use, have become obsolete; or been mutilated and disjointed by the unskilful incorporation of new discoveries.

Dr. Gorham has performed a valuable service to the University with which he is connected, and to the public at large, in the task he has undertaken; and which he has so far ac-

complished with great accuracy, industry and ability. We have been much in want of a book of the kind he has presented to us, which should afford a general, but at the same time, accurate and scientific view of the subject, without entering into those minuter details of practice, which are dry and revolting to all but the professional student. Upon the general principles of the science, upon those points particularly, which are applicable to the phenomena of the external world, with which we are most conversant, we are presented with full and ample discussions; whilst upon those which relate chiefly to the operations of the laboratory, and the manipulations of the practical chemist, the author has taken a narrower range, and confined himself to the most essential particulars.

In systems of chemistry the synthetic method has been most frequently adopted; though it has been often doubted, whether the analytic may not be better adapted to convey a knowledge of its principles.

'In a work of this kind,'—says Dr. Gorham,—'a refined and complicated system is not necessary. The plan which has been adopted is simple, and such as appeared to the author the best calculated to present to the reader in a natural order the series of connected facts. In elementary works, he believes that it is most expedient to commence with the general principles of the science, and in illustrating the doctrines of chemistry, it is not necessary that the reader should be intimately acquainted with the bodies by which these doctrines are to be demonstrated. The subjects, therefore, in the following pages, have been divided into two parts. The first part is devoted to the general laws of the science, and to the properties and modes of action of the powers or agents which are concerned in the production of chemical phenomena. In the second part are detailed the properties and relations of ponderable bodies and their compounds.' *Pref.* p. x.

The method adopted by Dr. Gorham we believe to be more unexceptionable, than that of works upon chemistry in general. Yet we conceive, that for the majority of readers, the best method of instruction would be, to follow, as nearly as possible, the course which the mind takes in investigating. The syn-

thetical arrangement, strictly carried into effect, must, it appears to us, be completely unintelligible except to an adept in the science. It is certainly desirable, in the acquisition of all learning, that we should go through the same processes of mind in studying the observations or discoveries of another, as if we had made them ourselves. We should, as far as possible, teach, or seem to teach ourselves. That which we have discovered by our own exertions is most firmly impressed upon our minds; and the same, though in a less degree, is true, if we follow the steps of the discoveries of another. By pursuing a train of investigation, we make it our own; and the impression of a fact thus acquired is far more lively and permanent, than if we retained it singly in our memory; because in the former case, it is connected with a train of associated ideas, by which it is more easily recalled into the mind than if it stood insulated and alone. Who does not receive a clearer notion of the relations of oxygen to the metallic oxides, from an acquaintance with the precise and logical experiments of Lavoisier, than he would from a dry detail of the simple matter of fact? And although it would be impossible to enter into minute analyses and histories of experiments in an elementary work, yet the general method is possessed of similar advantages; and it is for this we contend.

There are two classes of persons who pursue the study of chemistry—and indeed the same is true of every other science —those who wish merely to acquire such a knowledge of its principles and operations, as will enable them to understand the constitution and relations of the objects about them, and the causes of the different phenomena in the external world;—these study only the chemistry of nature;—and those who follow it professionally, who have more regard to its practical details and manipulations, than to its connexions with the operations of nature. These, if we may so speak, study principally the chemistry of the laboratory. Now there ought to be a great difference in the modes of instruction, where the objects to be attained are so different; and there is perhaps no question, that the synthetic method is best adapted for the education of the professional chemist. He should study the

science before he studies nature; and become master of its artificial and technical forms, before he applies them to the elucidation of any thing out of his laboratory. He should become familiar with the effects and changes wrought by his retort and crucible, before he would penetrate into the mysterious secrets of the air, the earth, and the ocean. But the opposite method seems, as we have intimated, better fitted for the purposes of the general scholar, who seeks only knowledge enough to enable him to comprehend the chemical economy of our globe, and the nature of those forms of matter with which we are most conversant.

Every advance in discovery carries our attention further and further from those substances with which we are most familiar. The elements of the ancients have long since been decomposed; and many of the substances into which they were separated, have been again and again subjected to the same process. If then we commence at the point where discovery has terminated, it is obvious that we immediately enter upon the consideration of objects perfectly new, and which, in fact, have no real, separate existence in nature, but are only found as the elements of other matter. As the science advances, then, we have to commence at greater distances from the ultimate purpose of our research, and to go through with an investigation of substances which have, in a certain sense, only an artificial existence, before we arrive at the consideration of those which it is our particular object to understand.

We think, then, that a general knowledge of the chemical constitution of bodies, and of the relations of the elementary substances to those compound forms of matter with which we are familiar among external objects, is best communicated by that method which it has been our object to recommend. The method proposed has also this excellence, which is of considerable importance, that it gives an immediate interest to the very commencement of the study; it awakens the curiosity and rouses the attention at once. We might be easily induced to listen to an account of the nature and composition of water, or of atmospheric air—substances with whose properties we are perfectly acquainted—when we should be completely indifferent about the history or description of oxygen, hydrogen,

or azote—names, of which we had never heard. The student, at the outset, has no knowledge even of the existence of these bodies; and their properties are unlike those with which he has been usually conversant. He is obliged to obtain the subjects of his investigation by long and tedious processes; for they are seldom found in nature in a separate state; and it is only after a careful examination of their various combinations, that he understands the constitution of th se substances with respect to which his curiosity is principally excited.

The fluctuating and progressive state of chemical knowledge is likewise an objection to the synthetic method of instruction. Till the science has been perfected, no arrangement can be adopted which will not be liable to constant variations, so long as new discoveries are made, and new views are taken of the ultimate composition of different species of matter. A complete and permanent arrangement upon this plan can be formed only when we know every thing within the limits to which human inquiry may extend, respecting the subjects about which it is employed. But this inconvenience, arising from the imperfection of our knowledge, is much less as it respects the opposite system. The forms of matter are always the same, although our views of their constitution may be constantly changing; and if they are taken as our guides, no changes in chemical theory can ever introduce confusion or disorder into a system founded upon this basis.

The first part of the work under consideration consists of five chapters, which treat of the general laws of the science, and of the powers concerned in the production of chemical phenomena. These powers are, attraction, including the attraction of cohesion, and chemical affinity, caloric, light, and electricity, to each of which a chapter is devoted; and the fifth is occupied in a discussion of their general nature and mutual relations. We cannot pretend to give any abstract of the very valuable matter, relating to these difficult but interesting subjects. Modern researches have given us new views on most of the important points of theory with regard to them; and Dr. Gorham has collected a full and able account of the present state of our knowledge, and of the discoveries and improve-

ments, which have made this one of the most curious and interesting departments of human science.

These changes have been principally brought about by the agency of electricity in chemical investigation; and the introduction of the Galvanic battery into the laboratory has formed an epoch in the history of the science, and given a new direction to the labours and studies of the chemist. The effects of this instrument are manifested in a variety of ways; in the production of an intense degree of heat in various bodies, violent shocks upon the human system, and a chemical decomposition of the most refractory substances; and these effects form some of the most wonderful exhibitions of the powers of matter which are afforded by human ingenuity.

When the voltaic apparatus, as it is usually denominated by chemists, is properly arranged,

'It will be found that the two extremities or poles are in opposite electrical states, the zinc always being positive and the copper always negative.'—'When the hands are well moistened and are brought into contact, the one with the positive, the other with the negative pole, a shock will be experienced proportional to the number of plates; the shock from a battery of four hundred plates is exceedingly violent. If the wires be terminated by cones of dry charcoal, made from boxwood; on forming the communication, sparks will be produced, and part of the charcoal will become red hot. When pieces of this substance, about an inch in length, and $\frac{1}{8}$ of an inch in diameter, were connected respectively with the positive and negative poles of the great battery of the Royal Institution, and brought very near each other, a bright spark was produced, and more than half the volume of the charcoal became ignited to whiteness; and, by withdrawing the points from each other, a constant discharge took place through the heated air, in a space equal at least to four inches, producing a most brilliant ascending arch of light, broad and conical in the middle.'

'The temperature excited in the circuit of batteries which are composed of a very large number of small plates, or of a small number of large plates is intensely high. The power to ignite bodies was almost equally apparent in a battery consist-

ing of two thousand double plates, each exposing a surface of thirty-two square inches; and in Mr. Children's arrangement, each triad exhibiting a surface of thirty-two square feet. By the former, platina, one of the most infusible of bodies, was melted in the arch of flame as readily as wax in the flame of a common candle; quartz, the sapphire, magnesia and lime, all entered into fusion; fragments of diamond, and points of plumbago and charcoal rapidly disappeared and seemed to evaporate. By the latter, 8½ feet of platina wire 0.44 of an inch thick were heated red hot; in small quantities it became bright red and melted at the ends; some of the most refractory oxides were reduced, and the most difficultly fusible metals melted into globules. The metals, when reduced to very thin leaves, do not require for their ignition or combustion that the power should be very high. Gold and silver leaf may be consumed, the one giving forth a brilliant yellow, the other a beautiful greenish white light, by connecting them with the poles of a battery composed of 100 double plates of three or four inches.

'The chemical effects of the voltaic apparatus are wonderful. Its operation is gradual, but continued, and no form of matter if compounded is able to resist its action. Compounds in the liquid state are decomposed with facility; but even insoluble compounds and the hardest and most solid aggregates are finally resolved into their elements by the decomposing power of voltaic electricity.' pp. 178—180.

By the introduction of wires of gold or platinum, connected with the two poles of the battery, into a vessel of water, this fluid is immediately decomposed, and its elements extricated; the oxygen being disengaged from the zinc or positive pole, and the hydrogen from the copper or negative; and this will take place when the distance of the wires through the water amounts to three feet. If, instead of these metals, those be employed which have a strong attraction for oxygen, the hydrogen only will be liberated, the oxygen combining with the metal; and on the other hand, if some other of the metals be employed, tellurium for example, no hydrogen is evolved at the negative extremity of the battery, but oxygen only, at the positive, whilst the appearance of the metal is

changed, and it is believed that a compound is formed of hydrogen with the metal, which may be called a hydruret. By a similar arrangement, many other substances may be decomposed, as ammonia, the mineral acids, the metallic and neutral salts; and in all these cases the elements evolved correspond to the known composition of the substance subjected to experiment.

In the decomposition of these substances, the acid is always separated at the positive, and the alkali or metal at the negative end of the battery; and this, even under the most unfavourable circumstances for the production of such effects.

'Thus, if three cups of agate or of gold be connected with the apparatus, the middle being filled with a solution of sulphate of potash, and the two others with pure water, and they be connected with each other by moistened amianthus, it will be found after a time, that the cup, positively electrified, will contain sulphuric acid, and the cup negatively electrified, potash, although no traces of either of these substances could be perceived in the water previous to the experiment. If the two extreme cups be filled with an infusion of red cabbage instead of water, the portion connected with the zinc end of the battery will become red, and that united with the copper end will be changed to a green; effects which are produced respectively by acids and alkalies.

'So powerful is this apparent attraction of acids to the positive end, and of alkalies or bases to the negative pole, that in passing to the respective extremities of the battery, it was proved by Sir H. Davy, that they might be made to proceed through, without combining with, substances, which in ordinary circumstances exert strong affinities. Thus, when solution of sulphate of potash was put into the cup connected with the negative end, liquid ammonia into the middle cup, and pure water into the cup in which was immersed the wire from the positive surface; on completing the circuit, and allowing the apparatus to remain in that state for some time, sulphuric acid was found in the water; when the order was inverted, the sulphate of potash being in the positive cup, acid in the middle, and water in the negative cup, the base of the salt, or potash, was discovered in the water. In the first instance, therefore,

acid matter was transmitted through ammonia, and in the second, alkaline matter or potash passed through an acid, without chemical union, notwithstanding the particles had freedom of motion, and are known to possess strong mutual affinities. By the same arrangements, acids and alkalies may be made to pass through coloured vegetable infusions without producing their characteristic effects.' pp. 185, 186.

The results obtained by means of the voltaic apparatus, and the great influence which this form of electricity was thus found to possess, in modifying and even neutralizing chemical affinities, suggested to Sir Humphrey Davy the idea of attempting, by the same means, the decomposition of the fixed alkalies; and the consequence was one of the greatest discoveries of modern science. These substances had been supposed to be compounds; but there had been no well grounded opinion formed with respect to the nature of their ultimate composition. By subjecting them, however, to the influence of a powerful battery, oxygen was given off at the positive pole, and at the negative were observed small globules of a metallic lustre, resembling mercury, which combined rapidly with oxygen, if exposed to it in any of its forms, and reproduced the pure alkali. By employing substances, into whose composition oxygen did not enter, to receive and contain the results of his experiments, this great chemist was enabled to obtain for observation quantities of the new metal; which was thus proved to be the base of the alkalies; and potash and soda to be consequently of the class of oxides. This discovery was easily extended; and, partly by actual experiment, and, partly by analogical reasoning, it has been concluded, that the alkaline and other earths are similarly constituted; that they are all oxides, resembling in composition those bodies acknowledged to be such, and having the same chemical relations and powers. Their bases have accordingly been ranked in the class of metals, with names, such as potassium, barium, &c. derived from those of their oxides, and corresponding in etymological structure to those of the other metals.

Much of the history of voltaic electricity, as applied to the operations of chemistry, and indeed many other of the inves-

tigations of modern chemists, have thrown considerable doubt on the prevalent opinions, respecting the nature and agencies of the powers by which the operations of nature are carried on. The causes of what we call the effects of caloric, of light and electricity, are generally believed to be fluids, unconfinable and imponderable, tending to diffuse themselves through space, capable of being transmitted from one substance to another, and of being accumulated in some bodies, and diminished in others, according to their several capacities, or the influence of a variety of circumstances. The theoretical speculations of philosophers have commonly proceeded upon this assumption; and it has not been long, that different opinions have attained any considerable currency. Such a belief is, however, at variance with many well known facts, and has been relinquished by some of the most distinguished chemists. It is not a great while since the mechanical phenomena of the universe were explained upon a similar hypothesis; and gravity like heat was supposed to be an all pervading fluid. Even within a few years, a similar doctrine has been hinted at with regard to magnetism; and it is obvious, that explanations might be given of chemical attraction or affinity upon the same principle. But such hypotheses are now relinquished as chimerical. Gravity and affinity are believed to be the result of certain properties or powers of matter, by which it is enabled to maintain certain relations, and the phenomena of magnetism, notwithstanding the exception to which we have just alluded, are now generally accounted for upon a similar principle. But the old method of explanation, has, for no satisfactory reason that we can perceive, been retained with respect to heat, light and electricity;—and their operations have been supposed to be performed by the interference of a specific sort of matter.

Yet where is the necessity of this interference of subtile and imponderable fluids? Does it in fact explain the phenomena in question any better than they can be explained without it? And if not, is it not unphilosophical, gratuitously to suppose their existence? There has always been, in the early stages of science, a great deal of this sort of philosophizing, which removes the difficulty it cannot solve, one step further off. How are the questions to be answered, when we

come to inquire, by what agents the revolutions of those subtile and imponderable fluids are effected, and by what causes they are made to perform the various offices assigned to them? The fact is, nothing is gained by these assumptions; one after another may be made without end. There have been some speculations with regard to electricity, which have introduced no less than two or three different modifications of each of the two opposite fluids, upon which its phenomena were imagined to depend. As science becomes more refined and genuine, such doctrines are rejected; and we have no doubt, when the laws of chemistry are as well understood as those of other branches of physical science, that its speculations will be as little encumbered by the relicks of former hypotheses.

It may, perhaps, be thought, that we consider the subject too curiously; but we really conceive that analogies sufficiently close exist between these different powers, to make it worth inquiry whether they are not all to be explained upon similar principles. To take caloric for example, do not its laws and those of gravitation resemble one another in many striking particulars? All the mechanical motions of the universe, we take it for granted, depend upon the power of gravitation, acting under different modifications and in different directions. The momentum acquired by a falling body is an accumulation of this power—as it may acquire an accumulation of caloric by percussion, friction, &c.—and it will produce motion in another substance, or raise the opposite scale of the balance, in the former case; as in the latter it will raise the mercury in the thermometer. The accumulated power of motion, like caloric, is also communicable, and tends to an equilibrium. If a body fall against the earth or some other fixed substance which is unelastic, its motion is destroyed; as a heated body is quenched at once in a large quantity of water. But if, on the other hand it impinge against a small moveable body, its power is partly transferred, and both bodies move on with a force exactly proportional to their size and quantity of matter. How nearly does this resemble the laws of the distribution of heat. If, however, the substance against which another falls be elastic, the moving body rebounds. The direction of the power on which its motion depends *appears to be* changed

or reflected, for the body itself is reflected from the elastic, precisely as light or heat is from a polished surface. We may find also without difficulty an arrangement by which we may produce an effect upon the gravitating power of matter, similar to that by which the light and heat of a large surface are concentrated in a single point. If we suppose a cone made to rest upon its apex, its whole weight is collected at that point. Now, in this case, the gravitating power of every particle out of the axis of the cone, is made to operate in a different direction from that in which it naturally would—i. e. towards the centre of the earth—and to assume a tendency towards the apex of the cone, as parallel rays of light or heat are collected in one point by the intervention of a lens, or by the reflection of a mirror.

The analogy between the laws of these powers of matter appears to us at least sufficient to render it probable that their nature is similar, and that if the phenomena of the one can be consistently explained without the intervention of any separate and specific material principle, those of the other may be also. But although we readily admit the probable immateriality of caloric, yet we cannot subscribe to the detailed explanation of this doctrine which has been advanced by Sir H. Davy.

'It is assumed,' says Dr. Gorham in his account of this theory, 'that in solids the phenomenon of heat results from a vibratory or undulatory motion of their particles, the temperature varying with the spaces between them, and the intensity of the vibrations; that in liquids and gravitating elastic fluids, the vibration is accompanied with a motion of the particles around their own axis, those of gaseous matter being performed with the greatest velocity; and that in etherial fluids or radiant matter, the particles move around their own axes, and separate from each other, penetrating in right lines into space. Temperature may be conceived to depend upon the velocity of the vibrations; increase of capacity upon the motions being performed in greater space; and the diminution of temperature during the conversion of solids into liquids or gases, upon the idea of the loss of vibratory motion, in consequence of the revolutions of the particles upon their own axes,

at the moment when the body becomes liquid, or aëriform, or from the lessened rapidity of vibration, from the motions being performed in a greater space.' p. 216.

Now all this is purely hypothetical; it could not from the nature of the subject be otherwise; and it is besides somewhat obscure. We are not called upon to enter so deeply into the hidden processes of nature. If we can render it probable, that the supposition of the existence of a peculiar species of matter is without foundation, we are not therefore obliged to show how things can be managed without it. The burden of proof lies upon the opposite side. The production of high temperatures by percussion and friction, and also by chemical combinations and decompositions, in which there is no condensation, affords a principal argument against the material nature of heat. Yet this has no bearing upon the opinions of Sir Humphrey Davy; but is simply of a negative character, tending merely to show that the received doctrines do not explain all the phenomena in question.

In considering the nature of caloric, we ought to throw out of view the relation it bears to our own sensations, which has in fact nothing to do with the question. These are immediately excited by a change in the state or actions of the extreme vessels, and not by any matter communicated from the heated body. The same sensations may be produced by substances of a temperature lower than that of the body, which have the power of exciting a similar action or change in these vessels. We refer to the operation of caustics.

Putting aside then the power of heated bodies upon our feelings, what other powers do they possess, by which they are distinguished from substances at the ordinary temperature of the atmosphere? The effect of a high degree of heat seems to be an increase of chemical energy, and an altered state of chemical affinity. If a piece of metal be heated to a certain degree, its tendency to combine with oxygen is augmented, and if it be exposed to the influence of the air it becomes an oxide. Here is a certain change produced in the chemical affinity of this substance; but at another degree of the thermometer, the same oxide which was thus formed becomes decomposed, and the metal is restored. Here is another

change in its chemical affinity. We perceive changes in chemical affinity, and we perceive nothing more. Expose the same metal, at any temperature, however low, with which we are acquainted, to the action of nitric acid, and similar changes will take place. But, in the last mentioned experiment, heat will be generated. The power, then, which produces the sensation of heat, may be considered merely as the result of the chemical state of certain bodies, of the action of their affinities, and not as a separate substance, the cause of that state and of the action of these affinities. Thus an electrical discharge, which is in itself possessed of no temperature, is capable of setting fire to an inflammable body;—that is to say, electricity, a powerful chemical agent, becomes the cause of a series of processes carried on in the combustible substance, in consequence of which, heat is generated. It is obvious, that upon the principles just stated, the sensible effects which take place in the common cases of combustion, are to be explained, not by the supposition of the extrication of caloric, a separate substance, but as produced, without any such intervention, by the chemical operations which are going forward.

The phenomena of light are certainly better explained, upon the theory of radiant particles issuing from the luminous body, than those of caloric are, upon the material hypothesis. But we have no evidence of the existence and nature of light except by its immediate effects upon our senses. Light is only a power in external objects of affecting our organs, so as to produce certain sensations; and the same sensations may be produced in circumstances where there can be no possibility of the presence of radiant light; as in passing the shock of a Galvanic battery through the head, a flash is distinctly perceived. But whatever doubts there may be with regard to the existence of light, as a separate substance, yet it must be confessed, that the subject is too little understood, to enable us to form any consistent and satisfactory hypothesis.

There seems, till of late, to have been little or no doubt among philosophers, that the phenomena of electricity were caused by the operation of a peculiar fluid or fluids, which pervaded all matter; and the respective theories of Dufay and Dr. Franklin, founded upon their several assumptions, have,

one or the other, been received by all men of science. The principles of these theories are sufficiently familiar to most of us.

'But an hypothesis differing essentially from them has been stated by Sir Humphrey Davy. Electricity is conceived by this distinguished Chemist to result from the general powers or agencies of matter, and its phenomena to be displayed in the attractions and repulsions between different bodies or their particles. In these cases they assume a polar arrangement, and the opposite extremities are dissimilarly electrified, the positive pole of one being opposed to the negative pole of the other. The effect is proportional to the violence with which the electrically attractive and repellent powers are exerted, and may be connected with the motions of the particles of the substances affected. The difference in what has been called the conducting powers of bodies, seems to depend entirely upon the different manner in which they receive the electrical polarities, or in which their parts become capable of communicating attractive or repellent powers to other matter. When an excited body is brought into the neighbourhood of an insulated conductor, the air being interposed, the nearest point of the conductor becomes dissimilarly electrified, the remote extremity similarly electrified, and the middle is in a neutral state. The conductor here acquires polarity with ease, and exhibits but two poles, and this polarity is *induced* by the proximity of the electrified body. The polarities of the two bodies may continue to be exalted, until they are annihilated through the air, producing what is commonly called an electrical discharge. The phenomena of sparks, discharges, and accumulated electricity, depend upon this law. The particles of different bodies are also inferred to possess inherent, electrical energies, and it is considered as not improbable, that the same arrangements of matter, or the same attractive powers which place bodies in the relations of positive and negative, i. e. which render them attractive of each other electrically, and capable of communicating attractive powers to other matter, may likewise render their particles attractive, and enable them to combine when they have full freedom of motion. Hence electrical and chemical phenomena may de-

pend upon the same power; in the former case acting upon masses, and in the latter upon the particles of matter.' p. 224, 225.

These principles, in general, appear to us to afford the best explanation of the phenomena of electricity; though the theory just stated is tinctured in a considerable degree by that fondness for minute and intricate specifications respecting the operations of nature, which is characteristic of the speculations of its celebrated author. There are many facts which tend to confirm the latter part of the passage just quoted, and to show the near connexion which exists between electricity and chemical affinity.

'Most of the substances, which act distinctly upon each other electrically, are such as act chemically when their particles have freedom of motion; this is the case with sulphur and the metals, with acid and alkaline substances; and the relations of bodies are uniform; those which have the highest attractive powers being in the relation of positive in arrangements in which chemical changes can go on.' p. 203.

'The connexion existing between electrical phenomena and chemical changes, is likewise evident in the general phenomena of the voltaic battery. The most powerful combinations are formed by substances that act chemically with most energy upon each other; and such substances as undergo no chemical change in the combination, exhibit no electrical powers.' p. 204.

These circumstances, and a variety of others which might be brought forward, lead almost inevitably to the conclusion, that electricity and chemical affinity are identical; that the phenomena attributed to them are the results of the same principle acting for different purposes and in different relations; and when viewed in connexion with other facts, afford likewise much ground for the belief, that heat, light and magnetism are also different exhibitions of the same cause, acting under various modifications, and producing different results, according to the nature of the substance which is operated on.

'An intimate connexion appears to subsist between electricity, light and caloric. As bodies require to be raised only to a

certain temperature to become luminous, so it is only necessary that the electrical excitation should be increased to a certain point to render them radiant. The effect of lightning in setting fire to combustibles is well known. The electricity excited by friction will inflame combustible liquids, gun-powder and the metallic exploding compounds. Transmitted in large quantities through the perfect conductors, it melts and dissipates them in globules. The temperature produced in the circuit of the batteries of Mr. Children and of the Royal Institution of London, was probably equal or nearly so to that of the flame of the oxy-hydrogen blowpipe, which is the highest that can be effected by art. Electricity even of low intensity is accompanied with light. The spark is familiar, and the star which is sometimes observed stationary upon the point of a conductor, is brilliant and well defined. A variety of bodies, when electrically excited, become phosphorent, and non-conductors subjected to friction are rendered luminous. The colour of the light is not always the same; it varies according to the intensity of the excitation, the distance to which it is to be transmitted, and the nature of the medium which opposes the action. In low degrees of excitation, the colour is red; in proportion as they are exalted, it becomes purplish, and when intense, white with a shade of violet.' p. 232, 233.

Wherever the electrical agency is supposed to operate with the greatest force, there light and heat are proportionally developed, as in the experiments related p. 179 of the work under review, of which we have given an account. Galvanism, as we have previously remarked, is capable of producing the sensation of a flash of light when the eyes are entirely closed; and the dry points of the wires connected with the extremities of the battery produce a feeling of heat in the skin, although their temperature is not raised. These powers of generating, as it would seem, light and caloric, by means of the electrical apparatus, lead to additional doubts of their material nature—for if material, whence is the immense and long continued supply derived in some of the operations of the galvanic battery? Or at least they imply, in all their phenomena, the operation of only common ultimate principles. For if it be argued in defence of the old hypothesis that the heat, &c. thus developed,

is caloric, set free by the chemical operations going on in the troughs of the battery, and which are probably necessary to its electrical powers—still, how is this caloric conveyed along the wires of the battery without raising their temperature, and brought into operation only, when their extremities are made to communicate?

As electricity produces heat, so too the variations of heat produce electricity. It is developed by changes of temperature and of form; by the cooling, for instance, of melted sulphur, by the production and condensation of vapour, and by heating certain mineral substances, which in their ordinary state exhibit no signs of electricity.

The light, which is a consequence of electrical operations, obeys the same laws as that of the sun, and is separable into the same elements by the prism. There is also a farther resemblance between the chemical powers of the different kinds of rays, into which the solar spectrum has been divided, and those of electricity. 'The rays at the red end, in their chemical powers, tend to burn bodies or combine them with oxygen; those at the opposite end tend to restore inflammability to bodies; and negative electricity, which exercises the same function, produces hydrogen gas from water, and the inflammable bases from their combinations.' In addition to all this, the influence which both light and electricity have in the production of magnetic power, points out another relation between them, and of both to that inscrutable principle on which the phenomena of magnetism depend. There is no doubt that they are both capable of communicating to iron, under certain circumstances, the polarity of the magnet.

Now what is the conclusion which most naturally follows from all these facts? Is it not this—that the phenomena of affinity, caloric, light, electricity and magnetism are all equally the consequences of certain laws of matter, by which the intimate constitution of substances is maintained, and their chemical revolutions effected; which operate in these different ways, and produce such various results, according to the circumstances of the operation, the nature of the bodies operated upon, and the nature of the substances which are the recipients of the effects? Thus if the stream of galvanic power be made

to pass through a wire of platina, intense heat is produced; if through a quantity of water, a solution of a neutral salt, or some other compound substance, the result is a chemical decomposition; if the subject be a thin metallic leaf, an opposite effect is produced, and the metal combines with oxygen. In some substances, friction is capable of producing an intense degree of heat; in others an excitation of electricity. These are a few exemplifications of this principle, but many others have occurred in the course of our remarks.

The second part of this work relates to the properties and relations of ponderable bodies, &c. They are divided by Dr. Gorham into the organized and unorganized, the former including those substances which are, or have been, parts of some living system; the latter, the inert mass of common matter. The same elements, however, enter into the composition of both, although they are combined by different laws, and for different purposes. The elementary substances described amount to fifty-two, but the existence of a few of these is somewhat hypothetical; and the number is continually varying with the progress of discovery; since it is one of the first principles of the science, that every substance is to be regarded as simple till proved to be a compound.

The elementary substances are arranged by Dr. Gorham under three classes; 1. Supporters of Combustion containing four, 2. Inflammable or acidifiable unmetallic bases containing seven, and 3. Metals containing forty-one individual species. The two first classes only are described in the present volume. Under the sections relating to the several elements, are included accounts of the principal combinations which they form with each other.

Lavoisier founded his system of chemistry, principally, upon the relations which oxygen was supposed to bear to the other elementary bodies; the influence it exerted in combustion; and upon the properties of those substances of which it formed a component part. It was believed to be the only supporter of combustion, and the principle on which the acids, whose composition was then known, depended for their peculiar properties. At the time this theory was promulgated, it was almost without exception applicable to the phenomena to which it re-

lated; and modern discovery has not so much tended to prove that its doctrines are false, as to narrow the limits within which they are to be applied. It has in the first place brought to light other supporters of combustion besides oxygen; or to speak more accurately, other elementary substances analogous to oxygen in most of their properties. In fact, neither of the substances included in this class is absolutely necessary to combustion; for, according to modern views, its phenomena are merely the consequence of intense energy of combination. If substances with strong chemical affinities combine, there is often an evolution of heat and light, whether any of the supporters be present or not. Some of the inflammable bodies themselves in their turn become fully as much supporters of combustion, as chlorine or iodine. There is a gas lately discovered called cyanogen, the basis of the celebrated prussic acid, composed of 46.78 carbon and 53.22 azote, which is capable both of being inflamed itself, and of supporting combustion in other substances. When kindled, it burns with a bluish flame, producing azote and carbonic acid; but if potassium be introduced into it, and heated, the metal takes fire and burns also with flame. The case is similar with respect to sulphuretted hydrogen. Though inflammable itself, it supports combustion in potassium, which will take fire in it and burn with great brilliancy. Unless the definition of combustion be confined within the limits of Lavoisier, there are no particular elements that we can distinctly class together as supporters of that process. Still there are sufficient analogies between the substances thus classed together in the present work, to authorise their arrangement in the same division; although there may be some doubt about giving them the distinctive title of supporters of combustion.

The views of the old theory respecting the constitution of the acids, were still more partial. It is generally believed by modern philosophers, that hydrogen, as well as oxygen, is capable of acting as an acidifying principle, when combined with a base; and that all those substances called supporters of combustion, form acids in union with hydrogen, except oxygen, and thus act both as bases and acidifying principles under different circumstances. Yet we cannot perceive why it should be

concluded, when an acid is produced by the combination of hydrogen with chlorine or iodine, that the former should be looked upon as the principle of acidification instead of the latter. We do not recollect any acid of very marked properties, in which the acidifying principle may not be supposed to be one of the supporters of combustion, with as much reason as hydrogen. But it does not seem to be necessary to conclude that acidification is dependent upon any particular principle, any more than combustion. It may be merely the consequence of a particular mode of union, and of some hidden analogies of constitution, which have hitherto eluded investigation.

A new modification of the theory of acidification has been lately advanced, which owes its origin to Dr. Coxe of Philadelphia, was adopted to a certain degree by Davy, and has been finally matured and presented to the world by Dr. Murray. Water has always appeared essential to the constitution of the stronger acids, and they have never been obtained in what was to be considered a dry state. But it may be, that the elements of the water do not enter into the composition of the acid as water, but as oxygen and hydrogen; and the reason why dry acid cannot be obtained is, that no such thing can exist; and all the water has been separated, which is separable without the decomposition of the acid.

'It is conceived by Dr. Murray that from the united action of the elements, viz. oxygen and hydrogen, a higher degree of acidity is acquired, than from the influence of either of them alone; and sulphur is quoted as affording a striking example. With hydrogen it forms a weak acid (*sulphuretted hydrogen*). With oxygen it also forms an acid, (*sulphurous acid*,) which though of superior energy, still does not display much power. With hydrogen and oxygen, it seems to receive the acidifying influence of both, and its acid (*sulphuric acid*) is proportionally exalted.' p. 525.

Similar views may be taken of the compounds of nitrogen and of carbon; and there seem to be strong grounds for the opinions which Dr. Murray advances. He has extended the same theory to the subject of the alkalies.

'As hydrogen in some cases gives rise to acidity, so it may in other cases occasion alkalinity. Under this point of view

ammonia, in which oxygen cannot be detected, is a compound of which nitrogen is the base, deriving its alkaline power from hydrogen; it stands therefore in the same relation to the other alkalies, that sulphuretted hydrogen does to the acids. The fixed alkalies, potash and soda, are considered as hydrates, that is to say, as bases united chemically with a certain proportion of water; but it is obvious, says Dr. Murray, that the elements of the water may exist in combination with the base; that potash, for example, is not a compound of oxide of potassium with water, but of potassium, oxygen and hydrogen.' p. 531, 532.

As a consequence of these views, the constitution of the neutral salts must be different from what is commonly supposed.

'Neutralization is not the saturation of acid with alkali, and the subversion of the properties of one by the opposed action of those of the other; but is the change of composition of both; and the quiescence of the elements in that proportion in which their affinities are in a state of equilibrium without any excess.'

'All these results display more fully the extensive relations of the two elements, oxygen and hydrogen. They do not act merely in opposition, as has been imagined, but more frequently in union, producing similar effects. Hydrogen is of nearly equal importance with oxygen, and the principal details of chemistry consist in their modified action on inflammable and metallic bodies.' p. 533.

In examining a system of chemistry of recent date, we cannot but be astonished at the accumulation of facts which has been made within the present century. Indeed, that part of the volume before us which relates to the details of the science, seems almost wholly occupied in the narration of new discoveries. As has been before observed, three substances are now classed with oxygen as supporters of combustion—chlorine, formerly the oxymuriatic acid; iodine, an entirely new substance strongly resembling chlorine; and fluorine, the supposed base of the fluoric acid, and bearing the same relation to it that chlorine does to the muriatic. To the class of simple inflammable bases, not metallic, two new substances have been

added, boron and silicon. The former combined with oxygen forms the boracic acid, whose composition was unknown in the days of Lavoisier; the latter is the base of silex, and is found to resemble more nearly this class of elements, than the earths with which it was formerly arranged. The alkalies and earths have been decomposed and proved to be metallic oxides; and a new alkali and a new earth have been added to the number of those formerly known to exist.

To enter into any account of the various compounds which have been brought to light, and can be formed from these various elements, would be at once useless and uninteresting. Yet it is worth while to state, that out of about forty, described in the present volume, at least one half are of very recent discovery, and of these the greater proportion are artificial or invented—if we may use the expression—that is, not existing in nature, but put together by the ingenuity or good fortune of the chemist.

Yet, notwithstanding all the brilliant discoveries, and the important truths which have graced the progress of modern chemistry, it is difficult to avoid regretting the overthrow of so simple and beautiful a system as that of Lavoisier. It is impossible for those of us, who have formed our ideas of the chemical operations of nature on the principles which he taught, to turn with complacency from a theory like his to a state of science so unsettled and so obscure, as modern chemistry now is. That the progress of discovery has most unquestionably overthrown the foundations of the old theory, we cannot doubt; yet it has substituted nothing in its room; and the science consists now in an immense mass of facts without any regular and consistent connexion. This, from the nature of the thing, is inevitable; and our chemists must leave to their successors the task of arrangement and generalization. They have torn down but have not built up. They have overthrown the works of Lavoisier, and yet there seems to be scarcely any thing certain in speculative chemistry, except what remains of his theory. And after all, he who desires only to understand the chemical constitution and operations of nature, will find them better explained and more easily understood upon the principles of the old school. Not that we would undervalue

the alterations and discoveries of our own times; they are a natural consequence of the advanced state of the science, and lead to its ultimate perfection. Yet they have made it less captivating to the general scholar; they have lessened the interest with which it is viewed by those not immediately engaged in its pursuits, by rendering it more complicated and more difficult to be understood, and less applicable as a whole to the explication of those phenomena of the natural world with which we are most familiar.

Chemistry has hardly received, in our own country, that attention, which its real importance, and intimate connexion with our national prospects and improvement, would seem to demand. The contributions which this science has made to the arts, the improvements it has suggested in many important manufactures, and above all the security it has given to the lives of thousands by means of the celebrated safety-lamp of Sir H. Davy, prove how much an enlightened and well directed philosophy may do to improve the condition of mankind. This consideration gives it a high claim to the attention of a nation like ours, and yet we have but few men among us, who have made it their profession to understand and teach it; and it is only to such that we can look for any important accessions of knowledge. Chemistry has become in Europe almost a separate profession; and we consider it as a most desirable event to have men of abilities and enterprize, devoted to it from inclination, who are at leisure to give themselves up wholly to its pursuit; and who are not obliged to labour in other occupations for a support, whilst the cultivation of their favourite study is only their relaxation and amusement. When we have such men among us, then and not till then shall we be able to contribute our full share to the science of the world; and to turn to the best account the various means which chemistry affords for the improvement of our own condition.

The length to which we have extended this article, as well as the particular remarks which we have had occasion to make on the character of the work under review, are sufficient proofs that we estimate it highly. We regard it, as far as it has yet been published, as one of the best introductions to the science with which we are acquainted. We look forward with interest to the publication of the second volume.

American Medical Botany, with coloured engravings. By Jacob Bigelow, M. D. Mem. Amer. Acad. Arts and Sciences, American Philosophical Society, &c. Rumford Professor, and Lecturer on Mat. Med. and Botany in Harvard University. Vol. I. Part II. Vol. II. Part I. Boston, Cummings and Hilliard, 1819.

[From the North American Review, for June, 1819.]

The appearance of the third number of Dr. Bigelow's work has completed one-half of his present inquiries on the medical botany of this country. We have in a former number offered an analysis of the first half volume of this work, and avail ourselves of the opportunity afforded by the publication of the third, to say something of its progress, and of the character under which it has advanced. It was natural for the author, when arrived at this part of his work, to look back on what he had done, and while reviewing his progress, to say something of the prospects of his undertaking. 'It gives him pleasure, he remarks, to state, that the reception of his work, in all parts of the United States, has exceeded his anticipations; that the subscription is already more than sufficient to defray the expenses of publishing, and that its regular increase renders it probable that the whole edition will be taken up at an early period.'

There are two views under which this work may be regarded, as a specimen of *art*, and as a *scientific publication*. The engravings are executed by a peculiar method, and one which we believe is at present but little known, at least among us. In his advertisement to the second volume, the author informs us, that 'the style of engraving is wholly new in this country, and is one which has been successfully attempted only by the first artists in France.' The peculiarity consists, we understand, in this; that the engravings are printed in colours applied to the copperplate, instead of being printed in black by the usual method and afterwards coloured by the hand. The second and third numbers, and likewise all of the first except about two hundred copies, are executed in this manner; the first plates having been re-engraved to adapt them

to the new method. This art, which though not wholly new, appears in this instance to be original, is the result of a series of experiments made under the direction of the author, by Messrs. Annin and Smith, engravers in this town. Considering the difficulties which attend the process, the result appears to us very successful. The plates we think are not all equally good, yet in most of them there is a delicacy of finishing in the lights and shades, which it would require great labour of the pencil, bestowed on each copy, to produce in the common manner. There is besides in these plates an entire absence of black outlines and veins, which are found in engravings, so that the figures in this work resemble original drawings or paintings, rather than engraved copies. There is also an advantage arising from this method, that an unlimited number of copies may be produced exactly alike, and varying far less than copies separately painted by the hands of different persons, as they must necessarily be in large works executed in the old manner. In this method a sufficient quantity of colour may be prepared at once for the whole impression of a plant. When the colours are simple and not much blended, a single plate may be employed; but when they are complicated, two or more plates must be used containing different parts of the plant. In the latter case the process of impression must be performed once for every plate. A certain degree of skill, which can be acquired only from practice, is necessary in the engraver, and a dexterity of the same kind is requisite in the pressman. The work of the press is much slower than in ordinary copperplate printing, yet more rapid than the usual mode of washing in colours.

Printing in colours has been at various times attempted in England and on the continent of Europe. It has however been abandoned, we are told, on account of the difficulty and expense attending it. In France it has recently been revived with satisfactory success. The elegant work of Michaux on the forest trees is partly executed in this manner, the lines and shades being printed in colours, and the surface afterwards washed with the same. The only finished works which we know, in which the surface, outlines and shades are said to be produced together from the copperplate, are those of

M. Redouté, whose large and splendid *livraisons* on the *Liliaceous plants* and the *Roses*, are among the most perfect specimens of botanical imitation which any country has produced. It appears that these magnificent publications have employed their author since the year 1796. A late number of the *Journal des Savans*, informs us that the method of *M. Redouté*, which they consider as having produced the most perfect specimens of botanical iconography, consists in the application of various colours to the surface of one copperplate, by modes peculiar to the author, and which he proposes to make public at a future day. The reviewers object to the old method, that it is attended with an inequality in the copies and an irregularity in the light and shades; and that the black lines which do not exist in nature prevent the imitation from being faithful. From these objections they consider *Redouté's* works as exempt, at the same time that his plates have all the softness and finish of original paintings.

Although it appears that the French process is hitherto kept a secret, there can be but little doubt that the principles on which the American work is executed are virtually the same. No greater inferiority exists than is naturally to be expected in a country where the arts are in infancy. In comparing the earlier with the later specimens of the American Medical Botany, we think a regular improvement is visible, and confidently look forward to future numbers for a perfection in this method of engraving, which will be creditable to the country.

We have heard it remarked, that the new engravings in this work want the finished appearance, the strongly defined outline of other botanical drawings. In these engravings the colours themselves of the leaves, flowers, &c. constitute their outline. This want of a terminal or marginal line to leaves and flowers, of a different colour from other parts of these portions of the plant, is in exact conformity to nature, which has given them no such outline, and it must be because we have determined what plants are, from drawings, and not from nature, if we consider this naturalness of Dr. Bigelow's figures a defect instead of a beauty. The accuracy with which this mode of engraving may be made to imitate different parts

of a plant, is very apparent in the plates of *Ictodes fœtidus* and *Panax quinquefolium* in the third number.

The mechanical execution of other parts of this work deserves notice and commendation. The type is remarkable for its clearness and beauty, and no pains have been spared to render the work elegant and correct.

Regarded as scientific publications, the second and third numbers of the American Medical Botany sustain the character of the first. The interest of the author remains unabated, and in the numbers under notice, he furnishes novel and valuable information about the medicinal properties of a number of our plants.

BIOGRAPHY.

Memoirs of the Life of Lewis Brugnatelli, M. D. *Professor of Chemistry in the University of Pavia, Member of the Imperial-royal Institute of Science, Literature and Arts of Milan, &c. &c.*

[From the Philosophical Magazine and Journal, for May, 1819.]

Modern Italy has produced few men whose lives have been more useful to society, or more interesting, not merely to their own country but to the civilized world, than that of Dr. Lewis Brugnatelli; who presents an illustrious example of talents and industry attaining eminence in science, although unsupported either byp ersonal wealth or powerful patronage. In any other country than Italy, the number and immense sale of his literary works on science would have procured him additional means of making chemical researches; but unfortunately for writers in the Italian language, a work of merit is no sooner published in any of the principal cities, than it is reprinted in all the adjoining states; and, in the commercial phrase, the market is often supplied with editions so shamefully incorrect, as to injure not merely the interest but also the honour of the original author. It is necessary to consider well the fatal consequences of this state of things, in order to appreciate more adequately the zeal and indefatigable exertions of the late chemical professor.

Dr. Lewis Brugnatelli was born in Pavia in 1761; his parents, not being in very affluent circumstances, had destined him for a mercantile life before he had received the rudiments of a literary education: observing, however, the strong bent of his mind, they afterwards thought of making him an engineer; but this study, although scientific, was little congenial to his feelings, and he immediately applied himself with the most in-

defatigable zeal to the study of medicine and chemistry; in which his progress was so rapid, notwithstanding the extreme scantiness of his means, that he not only obtained the degree of Doctor of Medicine in Pavia, 1784, but was shortly after elected Repeater of chemistry in the same university. By the death of Professor Leopoli he became pensioned Repeater in the College of Ghislieri, and in 1787 he was elected assistant to the chemical chair of Professor Leopoli, and afterwards to that also of Professor Brusati. During this interesting period he had given the most unequivocal evidence of his talents and skill both in chemistry and medicine. The science of analytical chemistry had just come into existence; curiosity and enthusiasm were awakened towards every thing that could be subjected to chemical action: a few chemical reagents had been discovered, and our juvenile professor eagerly availed himself of their aid to investigate the nature and properties of the gastric juice. His experiments were made and published the very year in which he graduated (1784), when he discovered that the gastric juice had invariably an acid character in carnivorous animals, while in herbivorous it was uniformly alkaline and putrescent. He was led to these experiments by the circumstance of Professor Carminati being engaged in making physiological researches on the gastric juice at the same period in the hospital. It was then ascertained, that the gastric juice of carnivorous animals had great curative powers when applied to foul ulcers or wounds, but that of herbivorous was destitute of this property. Professor Brugnatelli continued his researches; and combining the effects of the different kinds of gastric juice with that acid which he had also discovered in the stomach of all carnivorous birds, he succeeded in determining their solvent powers in the corrosion not only of metals but calcareous stones; and even pieces of rock-crystal and agate, introduced into the stomach, exhibited signs of its consumptive powers. These experiments were followed by an examination of the action of nitric acid on cork, in which the Professor discovered that a new and peculiar acid was developed, and which has since been called the suberic acid. At the same time he discovered a method of preparing fulminating silver, which he improved and extended to other substances; and which is

esteemed preferable to the process of Howard, being that now generally used for making fulminating balls, &c. The consequence of these discoveries led him to make new experiments on the salts (particularly nitrats) which had the property of detonating when mixed with a combustible body, and exposed to friction or a blow of a hammer; in order to demonstrate the quantity of caloric which might exist in bodies even in the solid state. He extended his ideas to the various kinds of combustion, proving the necessity of determining the difference between them; some being cold and obscure, others accompanied with the most vivid developement of caloric and light,—circumstances which must have a very great influence on the properties of a body that was united to oxygen. In the case of cold and obscure combustion, the body continues capable of presenting the detonating phænomena of caloric and light, when brought in contact with other combustible bodies; but it loses entirely this property if the caloric and light were disengaged previous to its union with oxygen. Of these facts and observations Thomson availed himself in his System of Chemistry, article *Combustion*, which is chiefly derived from the luminous researches and ingenious observations of the Pavian Professor. On these facts was founded the hypothesis respecting the constitution of oxygen, modifying the principles of Lavoisier, according to which many phænomena of combustion are very plausibly explained.

Among the ingenious researches and observations of Professor Brugnatelli, must be noticed, his opinion respecting the chemical action of the electric fluid, which he published so early as 1800, in his 'Memoir on oxyelectrics,' inserted in his *Annali di Chimica*, vol. xviii. In his 'Galvanic observations' published in the same work and in the Memoirs of the Italian Institute, he opposed decidedly the supposed formation of muriatic acid at the expense of water, as observed by Pacchiani, remarking, that this acid depended on other substances preexisting in the water. By these and other observations he made some progress towards those discoveries which have immortalized the name of Davy; who, on his part, did not fail to cite with great care and merited approbation the previous experiments of the Pavian chemist.

Professor Brugnatelli being at Paris in 1801, and in company with Volta, he mentioned the fact, that various substances are transported by the electric fluid, in presence of the French chemists and philosophers: all of whom smiled, saying, "The thing is impossible, that an imponderable body should transport ponderable substances." So far had the Italian chemist, as usual, anticipated the knowledge of the progress of chemical discovery, even in the French capital, where his experiments and discoveries were so novel and singular, that they were boldly and thoughtlessly disbelieved, instead of being investigated, verified or disproved. The Pavian Professor, however, had previously proposed a modification or a reform of the new chemical nomenclature; and as the greater part of the nomenclaturists were then living, it was the easiest and most effectual mode of avoiding difficulties, by totally disbelieving both the chemical and literary novelties. In 1806 he read a Memoir in the hall of the University, 'On the decomposition of salts effected by electricity,' which was afterwards printed in the first volume of his *Giornale*.

To detail with sufficient accuracy his numerous discoveries in pneumatic, vegetable and animal chemistry, would greatly exceed the limits prescribed to this brief memoir: to those pursuing similar inquiries, the subjoined list of his original works, copied from the *Giornale di Fisica*, edited by his son Dr. Caspar B. may be useful. It may likewise be proper to notice here that he discovered uric acid in the excrement of silkworms, free lime in rhubarb, and carbonate of lime in the urinary calculi of hogs, and more recently in those of men. His numerous experiments and researches appear in a posthumous 'Memoir on urinary calculi,' which is just published, and which abounds in new facts and observations, the result of great industry and extensive knowledge, derived from a vast collection of calculi, designs of which accompany the work. Among his researches in vegetable chemistry should be recorded his Experiments on Coffee-berries, which, being steeped some time in a solution of soda, displayed a beautiful emerald green; this colour, the same as occurs in ammoniure of copper, is dissipated in close receivers, but immediately reappears when brought in contact with atmospheric air. He also discovered

several new sympathetic inks, some hygrometric colours, reagents to detect poisonous substances; and greatly improved many pharmaceutical and chemical processes, introduced various new amalgams and paints, and obtained a very pure gum from the variegated aloes and various other vegetable products. His electric and galvanic experiments were equally numerous: and the curious fact of carbon becoming capable, by means of galvanism, of being oxygenated and hydrogenated, and when in this state a powerful electric, may contribute to facilitate further experiments of the like nature. The medical labours of professor Brugnatelli would have given him celebrity, had his chemical fame been less conspicuous. His experiments with chlorine in the cure of hydrophobia are too recent to require further notice; but whatever may be the final effects of this medicine, either in curing or mitigating a hitherto incurable disease, the merit of Brugnatelli in recommending it to the public must ever remain unimpaired. In such a calamity, every truly scientific medical practitioner will gladly avail himself of a medicine, which presents even the slightest hope of arresting the hand of Death, and which is so easily procured as to deprive either indolence or ignorance of a pretext for not promptly administering it. The observations and statements of the Pavian Professor have been translated into almost all the European languages; and should any obstinate or wilfully incredulous practitioner omit its application, he will necessarily expose himself to the censure of friends.

Finally, Brugnatelli was appointed professor of general chemistry applied to the arts, in the University of his native city, Pavia, in 1796; and he filled this chair with equal honour to himself and advantage to the numerous students from all parts of Italy and the Levant who attended his lectures, till his death on the 24th of October 1818, in his fifty-eighth year. The following list of his published writings is principally taken from the catalogue printed in the *Giornale* edited by his son. Original works:—'Elements of chemistry;' four editions of this work have been sanctioned by the author, how many have been pirated it is impossible to tell. 'A General Pharmacopœia;' of this, five editions have been printed, and it has been translated into other languages. 'Materia Medica,' a supplement to the

preceding, in one volume. The periodical works which he edited were:—*Biblioteca Fisica d' Europa*, from 1788—91, 20 volumes. *Giornale Fisico Medico*, afterwards continued under the title of *Avanzamenti della Medicina e Fisica*, 1792—96, 20 volumes. *Annali di Chimica*, 1790—1805. *Commentari Medici*, edited in company with Brera, 1797, one volume. *Giornale di Fisica, Chimica e Storia Naturale*, 1808—18; the first eight volumes were edited by Brugnatelli alone, the remainder in company with Brunacci, Configliachi, and his son.

His detached memoirs and papers must be enumerated in their chronological order. In 1784 appeared his 'Letter on the means of preserving various insects, and chemical analysis of the gastric juice,' in the *Oposculi scelti* of Milan, vol 7. In 1785, 'Letter on the solvent power of the gastric juice of certain animals,' *ib.* vol. 8; and 'On the peculiar properties of vitriol of iron,' published in Crell's Annals. In 1786, 'Memoir on the nature of cork,' *Opus. seelt.* Milan, vol. 9. In 1787, 'On the action of turnsole upon animal matter 'On the sediment of urine, On the corruption of animal matter in different kinds of acid, and Experiments on the constituent parts of alcohol, of gall,' &c. all published in Crell's *Annals*. In 1788, 'Fructification of the rose, and analysis of the saliva,' Rozier's Journal, vol. 33; 'New sympathetic inks, method of restoring ancient writings, and discoveries respecting vegetable substances,' *Biblioteca*, vols. 3 and 4. In 1789, 'New method of obtaining acid from concentrated vinegar,' *ib.* vol. 10. In 1790, 'Method of rendering paper and ink indestructible by fire, new mode of bleaching wax,' *ib.* vols. 14 and 17. 'Singular property of certain substances to move themselves upon water,' *Ann.* vols. 1 and 22; 'On oxygenated muriatic acid used as a photometer, and easy mode of discovering nitrous in vitriolic acid,' *ib.* In 1791—2 and—3 appeared 'A new mode of preserving and concentrating citric acid, a new neutral salt, observations on some insects, and chemical reagents for the use of travelling naturalists,' *ib.* vol. 4. In 1794, 'Easy mode of impregnating water with the acidulous carbonat of potash, on the perennial heat of the tepid water of St. Pellegrino, and chemical analysis of the vegeto-mineral mire of Trescore,' *ib.* vols. 5 and 6. In 1795, 'Letter on animal electricity, on caloric and light, medi-

cal observations, and proposals for reforming the new nomenclature,' *ib.* vols. 7, 8, 9, 10, and 13. This latter work excited considerable attention to the chemical and literary labours of the Pavian professor: the nomenclature which he proposed has been generally adopted by Italian chemists, and it is perhaps well suited to the genius of the language. Although subsequent discoveries have not sanctioned the principles which it favours, it has nevertheless been extremely useful in Italy, in a country where numbers read and speak of chemistry and chemical subjects without any practical knowledge; where there are very few practical, but many theoretical and critical chemists, who, being amused with literary subtleties and refinement of terms, have disseminated a taste for chemical studies, which may ultimately lead to practical experience, and consequently useful discoveries. In 1796 and two following years, he published his 'Researches on combustion, the action of medicines on the animal body, on phosphorus, and fulminating bodies, saccharic acid considered as a reagent, convenient apparatus for making carbonated and other mineral waters, on fulminating gold, on the difference between oxygen and termoxygen, process for making mosaic gold, on urinary calculi, description of a compound still to obtain brandy and alcohol at the same time; on ammoniure of cobalt, and an acid in zaffre; method of obtaining crystallized oxymuriate of lead and of calomel without corrosive sublimate; on ethers, albumen, ammoniures of mercury and zinc,' *Ann.* vols. 10—22. In 1800, he again published 'A table of the modern chemical nomenclature,' which occasioned some controversy: but his principal exertions were directed to galvanic experiments during this and the two following years. Among the papers, however, which he published during this period, may be mentioned his 'Observations on vesicular vapours suspended in air at the freezing temperature, on the conversion of fixed oils into wax, sensibility of plants, a detonating oxymuriate of lead, and on the phosphorism of animal bodies.' In the Memoirs of the Italian Institute for 1806, appeared his 'Observations on the identity of some new characters of carbon with those of the metals,' which have since been so amply illustrated. Many other memoirs and translations of chemical and medical works issued from his pen; and

his countrymen now begin to appreciate more justly his merits as a philosopher, when they can no longer enjoy his amiable character as a man. Fortunately for them and the friends of science, his son and successor pursues with success the noble career of his father; and Brugnatelli's Journal, almost the only scientific periodical work at present published in Italy, may continue to be the vehicle of new discoveries in the arts and sciences, to enlighten and instruct some of the most ingenious, friendly and good-natured people in the world.

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

METEOROLOGICAL OBSERVATIONS.

STATE of the weather at Philadelphia during the last six months of 1819.

JULY.

Thermometer—Lowest at 8 A. M. 67. 7th day of the month.
Highest at 3 P. M. 92. 31st day.
Mean, ... 78.

Winds chiefly south-west—heavy rain 26th—An hot and dry month. The season uncommonly hot and dry in Europe. A comet appeared on the 4th inst. in the north-west, but was seen for a short time. Some cases of measles in this and last month—June 28, several cases of malignant fever, which continued in this and next month but did not become epidemic—the whole number affected did not exceed twenty-two persons—the disease was unusually mortal.

AUGUST.

Thermometer—Lowest at 8 A. M. 63. 27th day of the month.
Highest at 3 P. M. 94. 1st day.
Mean, ... 75.

Winds variable—between east and west—little rain—and not much thunder—Crops of winter grain good—Indian corn, a moderate crop—Peaches and melons abundant, and good—Apples scarce—Vegetables good and plenty—Whooping cough and Cholera infantum prevalent—Measles continue—The Plague rages in Africa.

SEPTEMBER.

Thermometer—Lowest at 8 A. M. 54. 21st day of the month.
Highest at 3 P. M. 88. 3d day.
Mean, ... 70.

Winds very variable—Some refreshing showers—A very severe hurricane in the West Indies, on the 20th and 21st of the month—Malignant fever at Boston and New-York, but did not spread generally in those cities; although the number

of deaths was very considerable—It was epidemic at Baltimore, Charleston, Mobile, Orleans, Natches and Bermuda—The measles continue to spread at Philadelphia—The malignant fever prevailed extensively, in this, and the two succeeding months, at Cadiz, and in its vicinity.

OCTOBER.

Thermometer—Lowest at 8 A. M. 38. 26th day of the month.
Highest at 3 P. M. 76. 7th day.
Mean, ... 55.

Chiefly westerly winds—mostly dry weather—On the 12th of the month an aurora borealis, with a beautiful bow, leading from the eastern to the western horizon, at 8 o'clock P. M.—Measles spreading.

NOVEMBER.

Thermometer—Lowest at 8 A. M. 29. 30th day of the month.
Highest at 3 P. M. 67. 12th day.
Mean, ... 48.

Westerly winds—heavy rain on the 16th—generally dry—Measles continue to spread.

DECEMBER.

Thermometer—Lowest at 8 A. M. 21. 30th day of the month.
Highest at 3 P. M. 50. 7th and 9th days.
Mean, ... 40.

Winds westerly—little rain—several small snows—and an heavy fall of snow on the 30th—The whole season has been healthy—Small-pox but little heard of—Measles have now become epidemic—a mild kind.

DISPENSARIES.

By the statements published, it appears, that the number of patients under their care have been:

Philadelphia Dispensary.

From December 1st 1818, to December 1st 1819,		2,294
Of these the number Cured is - - -	2,022	
Relieved, - - -	82	
Dead, - - -	69	
Irregular or uncertain, -	31	
Removed, - - -	34	
Remaining under care, -	56	2,294

Southern Dispensary.

From December 1st 1818 to December 1st 1819,		1,642
Of these the number Cured is - - -	1,484	
Relieved, - - - -	73	
Dead, - - - -	33	
Removed, - - - -	11	
Remaining under care,	41	—1,642

Northern Dispensary.

From December 1, 1818 to December 31, 1819,		745
Of these the number Cured is - - -	583	
Relieved, - - - -	42	
Removed, - - - -	32	
Irregular, - - - -	17	
Dead, - - - - -	44	
Remaining under care, -	27	—745

Making a total of four thousand six hundred and eighty-one.

New French mode of discovering Ulcers in the Lungs. Extracted by Mr. GRAY, from l'Analyse des Travaux de l'Academie Royale des Sciences pendant l'Année 1818. Par M. LE CHEVALIER CUVIER.

[From the London Medical Repository, for August, 1819.]

IN a climate so variable as England, where, according to common opinion, pulmonary complaints are more usual than in other countries, and where so very large a proportion of our youth are cut off yearly by consumptions, every means of improvement in respect to the diagnosis, and to the ascertaining of the progress of ulceration in the lungs, must be of great value to the profession.

Dr. Laennec, a physician of Paris, has presented to the Royal Academy of Sciences, a memoir upon the mode of exploring the diseases of the thorax by means of the communication of sound. For this purpose he sometimes employs a solid cylinder; at other times a tube, the sides of which are very thick; and at others, a tube spread out at one end like a funnel. One end of these instruments is applied to different

parts of the thorax, and the ear of the physician applied to the other.

The thick sided tube, or, in other words, the cylinder pierced along its axis by a narrow tube, being applied to the chest of a person who is talking or singing, and who is in good health, only communicates to the ear of the physician a sort of humming noise, more or less distinct; but if the person has an ulcer in his lungs, a singular phenomenon occurs. The talking or singing is no longer heard by the ear which is not applied to the tube, but the sound is conveyed entirely to the physician by the tube. The same phenomena occur when the tube is applied to the trachea or larynx of a healthy person.

By means of these instruments the movements occurring in respiration, and the beating of the heart, may be distinctly heard; so that their regularity, or disordered motion, may be estimated with facility.

The Royal Society of London.

[From the London Medical and Physical Journal, for August, 1819.]

A paper by Dr. FERGUSON was read, January 18th, 1819, *On the poisonous fishes of the Caribbee Islands.* The author endeavoured to prove, that, in all the larger fishes of prey, the poisonous quality was a rare and accidental occurrence; and that it was found to be present only at a certain season in the year, in one or two of the smaller species of fish, more particularly in the *yellow-billed sprat*, the *sardine doré* of the French, and *clupea thryssa* of naturalists; whence he inferred, that the larger voracious fishes, such as the *baracosta*, *perca major* of naturalists, &c. became poisonous only at the times they had recently been feeding on the smaller poisonous prey. The notion of these being made poisonous from lying on copper-banks, or their eating the stinging blubbers, the *medusæ* and *holothuriæ*, was refuted. In regard to the tests, it was shown that none could be depended on; that nothing whatever could be discovered from inspection of the fish; that the test of boiling a piece of silver with the suspected fish, proved nothing, whatever might be its actual quality; that, so far from there being any marks of disease in the viscera, or other parts,

of poisonous fishes, they were generally found to be in the best state in every respect.

The poison of the yellow-billed sprat was supposed to exist in the animal at certain seasons of the year, and not to be occasioned by its having fed on any undiscovered local marine poison, from the circumstance of the other smaller fishes of the same genus, that were found in the same places, never partaking of the poisonous nature; and from the poison of the fish being more potent and deadly than any other known, or even supposed, article of food could be likely to communicate.

With respect to remedies and antidotes, the efficacy of sugar was alone established as deserving of credit. Wines, spirits, and the condiments used at table, were believed to have obtained occasional credit only from their being used in slight cases of the poison, as would most likely have terminated in a favourable manner without any remedy. As a precaution in all cases of suspicious fish of the larger species, the cleaning them out as soon as caught was recommended as a useful and proper one, to prevent the carcase being further tainted by the lodgment of any poisonous matter, such as that of the yellow-billed sprat, recently swallowed; though it was shown, at the same time, that the doing so, and even salting the fish afterwards, could not, in any instance, remove the poisonous impregnation so communicated to these voracious creatures; whose powers of assimilation, from the shortness of the intestines and great size of the liver, must be supposed to be infinitely quicker than what takes place amongst terrestrial animals. It was useful also in another way, by furnishing the material of the only criterion hitherto discovered for detecting the poison, which was shown to be that of giving a portion of the liver or offal to some inferior animal, such as a cat, a duck, or a pig, and ascertaining its effects upon them before making use of the fish.

PYROLIGNEOUS ACID.

Extract of a Letter from M. G. C. at Paris, to Professor VAN MONS.

"A DISCOVERY of the greatest importance engages at this moment the attention of the scientific world. A. M. Monge has

discovered, that the pyroligneous acid obtained from the distillation of wood, has the property of preventing the decomposition and putrefaction of animal substances. It is sufficient to plunge meat for a few moments into this acid, even slightly empyreumatic, to preserve it as long as you please. Cutlets, kidneys, liver, rabbits, which were thus prepared as far back as the month of July last, are now as fresh as if they had been just procured from the market. I have seen carcases washed three weeks ago with pyroligneous acid, in which there is as yet no sign of decomposition. Putrefaction not only stops, but it even retrogrades. Jakes exhaling infection cease to do so as soon as you pour upon them the pyroligneous acid. You may judge how many important applications may be made of this process. Navigation, medicine, unwholesome manufactories, will derive incalculable advantages from it. This explains why meat merely dried in a stove does not keep, while that which is smoked becomes unalterable. We have here an explanation of the theory of hams, of the beef of Hamburgh, of smoked tongues, sausages, red herrings, of wood smoked to preserve it from worms, &c. &c."

Dr. Jorg, Professor at Leipsic, has since made many successful experiments of the same nature. He has entirely recovered several anatomical preparations from incipient corruption, by pouring this acid over them. With the oil which is produced from wood by distillation in the dry manner, he has moistened pieces of flesh already advanced in decay; and, notwithstanding the heat of the weather, soon made them as dry and firm as flesh can be rendered by being smoked in the smoking-room. All traces of corruption vanish at once when the *vinegar of wood*, or the *oil of wood*, is applied to the meat with a brush. The Professor has also begun to prepare mummies of animals, and has no doubt of success. He promises great advantages to anatomy, domestic œconomy, and even to medicine, from this discovery; for the remedy seems very fit to be applied internally and externally in many disorders; and intends to publish the result of his further experiments.

Philosophical Magazine and Journal, for July, 1819.

Polyphagism.

ALL the polyphagists whose wonderful deeds are recorded in history, are superseded by the famous TARRARE, who was known to all Paris, and who died at Versailles about twenty years since, at the age of twenty-six years.

M. le Baron PERCY, who saw Tarrare, and who made some investigations respecting this singular personage, has given us the history of him, in a very curious memoir on Polyphagy: it is from this memoir that I shall extract the particulars I am about to relate of Tarrare. Tarrare has renewed amongst us the fable of ERISICHTON, who, according to OVID, devoured at one meal what might have sufficed for a whole city, or a whole nation.

——quod urbibus esse,
Quodque satis poterat populo.

At seventeen years of age, Tarrare weighed only one hun- pounds, and was already able to eat, in twenty-four hours, a quarter of a bullock of that weight. Having left his parents when very young, (he was of the environs of Lyons) sometimes begging, sometimes stealing, to obtain subsistence, he attached himself to one of the shows on our boulevards, where we see exhibit themselves, in turn, Gill, Harlequin, and Punchinello. One time, on the stage, he defied the public to satiate him, and ate in a few minutes a panier-full of apples, furnished by one of the spectators; he swallowed flints, corks, and all that was presented to him. At the commencement of the war Tarrare entered into a batallion; he served all the young men in easy circumstances in the company, did all their jobs for them, and ate up the rations they left for him. Famine nevertheless gained upon him; he fell sick, and was taken to the military hospital at Soultz. On the day of his entry he received a quadruple allowance; he devoured the food refused by the other patients, and the scraps about the kitchen; but his hunger could not thus be appeased. He got into the apothecary's room, and ate there the poultices, and every thing he could seize. "Let a person imagine," says M. Percy, "all that domestic and wild animals, the most filthy and ravenous, are

capable of devouring, and they may form some idea of the appetite, as well as of the wants of Tarrare." He would eat dogs and cats. One day, in the presence of the chief physician of the army, Dr. LORENCE, he seized by the neck and paws a large living cat, tore open its belly with his teeth, sucked its blood, and devoured it, leaving no part of it but the bare skeleton: half an hour afterwards he threw up the hairs of the cat, just as birds of prey, and other carnivorous animals, do. Tarrare liked the flesh of serpents; he managed them familiarly, and ate alive the largest snakes (*couleuvres*) without leaving any part of them. He swallowed a large eel alive without chewing it, but we thought we perceived him crush its head between his teeth. He ate, in a few instants, the dinner prepared for fifteen German labourers: this repast was composed of four bowls of curdled milk, and two enormous hard puddings. After this the belly of Tarrare, commonly lank and wrinkled, was distended like a balloon: he went away, and slept until the next day, and was not incommoded by it. M. COMVILLE, the surgeon-major of the hospital where Tarrare then was, made him swallow a wooden case, enclosing a sheet of white paper: he voided it the following day by the anus, and the paper was uninjured. The general-in-chief had him brought before him; and, after having devoured in his presence nearly thirty pounds of raw liver and lights, Tarrare again swallowed the wooden case, in which was placed a letter to a French officer, who was a prisoner to the enemy. Tarrare set out, was taken, flogged, imprisoned; voided the wooden case, which he had retained thirty hours, and had the address to swallow it again, to conceal the knowledge of its contents from the enemy. They tried to cure him of this insatiable hunger, by the use of acids, preparations of opium, and pills of tobacco; but nothing diminished his appetite and his gluttony. He went about the slaughter-houses and bye-places, to dispute with dogs and wolves the most disgusting aliments. The servants of the hospital surprised him drinking the blood of patients who had been bled, and in the dead-room devouring the bodies. A child fourteen months old disappeared suddenly; fearful suspicions fell on Tarrare; they drove him from the hospital. M. Percy lost sight of him for four years: at the

end of this time he saw Tarrare at the civil hospital at Versailles, where he was perishing in a tabid state. This disease had put a stop to his gluttonous appetite. He at length died in a state of consumption, and worn out by a purulent and fetid diarrhœa, which announced a general suppuration of the viscera of the abdominal cavity. His body, as soon as he was dead, became a prey to an horrible corruption. The entrails were putrefied, confounded together, and immersed in pus: the liver was excessively large, void of consistence, and in a putrescent state; the gall-bladder was of considerable magnitude; the stomach, in a lax state, and, having ulcerated patches dispersed about it, covered almost the whole of the abdominal region. The stench of the body was so insupportable, that M. Tessier, chief surgeon of the hospital, could not carry his investigation to any further extent.

Tarrare was of a middle-sized stature; his habit of body was weak and slender; he was not of a ferocious spirit; his look was timid; the little hair he had preserved, although very young, was very fair, and extremely fine. His cheeks were sallow, and furrowed by long and deep wrinkles: on distending them, he could hold in them as many as a dozen eggs or apples. His mouth was very large; he had hardly any lips; he had all his teeth, the molares were much worn away, and the colour of their enamel streaked like marble; the space between the jaws, when they were fully separated, measured about four inches: in this state, with the head inclined backwards, the mouth and œsophagus formed a rectilinear canal, into which a cylinder of a foot in circumference could be introduced without touching the palate. Tarrare, says M. Percy, was constantly covered with sweat, and from his body, always burning hot, a vapour arose, sensible to the sight, and still more so to the smell. He often stank to such a degree, that he could not be endured within the distance of twenty paces. He was subject to a flux from the bowels, and his dejections were fetid beyond all conception. When he had not eaten copiously within a short time, the skin of his belly would wrap almost around his body. When he was well satiated with food, the vapour from his body increased, his cheeks and his eyes became of a vivid red; a brutal somnolence, and a sort of hebi-

tude came over him while he digested. He was in this state troubled with noisy belchings, and made, in moving his jaw, some motions like those of deglutition. M. Percy never saw in him any signs of rumination. The young Tarrare was almost devoid of force and of ideas. When he had eaten to a moderate extent, and his hunger only appeased, he was quick and active; he was heavy and sleepy only when he had eaten to excess.—*London Medical and Physical Journal, September*, 1819.

Hyposulphuric Acid.

A new acid has been recently discovered by MM. Gay Lussac and Welther, which they have called *Hyposulphuric Acid*, and an account of which was communicated to the Institute of France, on the 5th of April 1819. They obtained it by passing a current of sulphurous acid gas, over a solution of peroxide of manganese in water; then filtering and pouring into the liquor, a certain quantity of barytes, and causing a current of carbonic acid gas to pass over it, if there is an excess of this; then by pouring upon it sulphuric acid, the barytes is thrown down, and the new acid is obtained, which is dried under the receiver of an air-pump, by sulphuric acid. The greater number of the salts which it forms with earthy or metallic bases, are soluble, and crystallize. The hyposulphates of barytes and lime are inalterable in air; and the suberic acid and chlorine do not decompose the hyposulphate of barytes. This new acid is composed of two proportions of sulphur, and five of oxygen.—*Edinburgh Philosophical Journal, June*, 1819.

Raiz Preta, or Black Emetic Root.

The natives in the interior of Brazil use the infusion of the root of a plant, somewhat resembling ipecacuanha, with great effect, in the cure of dropsy, and in destroying the dangerous effects produced by the poison of serpents. When taken, it produces vomiting, and afterwards acts most powerfully on the urinary organs, occasioning for five or six days an extraordinary flow of urine. One dose is said to be sufficient for the cure of the bite of serpents, but many are required for the removal of dropsy.—*Edinburgh Philosophical Journal, June*, 1819.

Scientific Travellers in Brazil.

It is probably not generally known that at this moment scientific travellers are traversing all parts of Brazil, under the protection of the Portugueze, and at the expense of the Austrian, Bavarian and Tuscan Governments. On the part of Austria, the following are employed: 1. Professor Mikan for natural history in general, and botany in particular: 2. Dr. Pohl as mineralogist: 3. M. Natterer for Zoology: 4. M. Schott as gardener: 5. M. Socher as huntsman: 6. M. Ender as landscape-painter. 7. M. Buchberger as botanical painter, and M. Frick as natural history painter. On the part of Bavaria, 1. Dr. Spix as zoologist, and 2. Professor Martinus as botanist. On the part of the Grand Duke of Tuscany, Dr. Radi as Naturalist.—*Edinburgh Philosophical Journal, June*, 1819.

AMERICAN PHILOSOPHICAL SOCIETY

At an election of officers of the Society, held at their Hall on the 7th January, 1820, the following persons were chosen.

President—Robert Patterson.

Vice Presidents—William Tilghman.—Peter S. Duponceau.—Zaccheus Collins.

Secretaries—Thomas C. James.—R. M. Patterson.—Robert Walsh, Jr.—George Ord.

Counsellors for three years—James Gibson.—Nathaniel Chapman.—Robert Hare.—William Hembel.

Curators—Joseph Cloud.—Thomas T. Hewson.—Reuben Haines.

Treasurer—John Vaughan.

National Pharmacopœia.

The General Convention, for the formation of a National Pharmacopœia, met at the City of Washington, January 1st, 1820.

LIST OF AMERICAN PUBLICATIONS.

Chemistry.

A System of Chemistry for the use of Students of Medicine. By Franklin Bache, M. D. Member of the Academy of Natural Sciences of Philadelphia.

The Elements of Experimental Chemistry, by William Henry, M. D. F. R. S. &c. The first American from the eighth London Edition, comprehending all the recent Discoveries, together with an Account of Dr. Wollaston's Scale of Chemical Equivalents. Also, a Substitute for Woulfe's or Nooth's Apparatus; and a New Theory of Galvanism, by Robert Hare, M. D. &c. in two volumes.

Medicine.

Statement of Improvements in the Theory and Practice of Medicine. By Thomas Ewell, M. D.

A Materia Medica of the United States, systematically arranged. By William Zollickoffer, M. D.

Natural History.

An Analysis of the Mineral Waters of Saratoga and Ballston, with Observations on the geology and mineralogy of the surrounding country. By John H. Steel, M. D. Second Edit. improved.

Outlines of Botany, taken chiefly from Smith's Introduction; containing an Explanation of Botanical Terms, and an Illustration of the System of Linnæus. Also some Account of Natural Orders, and the Anatomy and Physiology of Vegetables. Illustrated by Engravings. For the use of schools and students. By Dr. John Locke, Lecturer on Botany. 12mo. pp. 162.

American Medical Botany, with coloured engravings. Royal 8vo. Vol. II. Part II. By Jacob Bigelow, M. D. Rumford Professor, and Lecturer on Materia Medica in Harvard University.

LIST OF RECENT EUROPEAN PUBLICATIONS.

Medicine, Anatomy and Surgery.

Synopsis Zo-nosologica: by Thomas Parkinson, M. D. 12mo.

Illustrations of the Power of Emetic Tartar in the Cure of Fevers, Inflammation and Asthma, and in preventing Consumption and Apoplexy; by William Balfour, M. D. 8vo.

On the Mechanism and Motions of the Human Foot and Leg: By John Cross, M. D. 8vo.

A Report of the Practice of Midwifery at the Westminster General Dispensary during 1818, by A. B. Granville, M. D. 8vo.

Medical Sketches on various Subjects: by G. Kerr. 8vo.

On the Diseases of Literary Persons; by M. Perkes. 8vo.

Essay on Bathing; with Practical Observations on the Diseases of the Skin, &c. &c. by Sir Arthur Clarke. 8vo.

Additional Experiments on the Arteries of Warm Blooded Animals; by C. H. Parry, M. D. 8vo.

Observations on the Prevalence of Fever in various parts of the United Kingdom; by D. I. H. Dickson, M. D. F. R. S. Ed.

Auxiliaries to Medicine; by Charles Gower, M. D.

An Inquiry illustrating the Nature of Tuberculated Accretions of Serous Membranes; by John Baron, M. D. With plates, 8vo.

An Essay on the Diagnosis between Erysipelas, Phlegmon and Erythema: by G. H. Weatherhead. 8vo.

Opinions on the Causes and Effects of Diseases in the Teeth and Gums, with coloured plates; by C. Bews. 8vo.

A Treatise on the Structure of the Urethra; by J. Arnott. 8vo.

On the Circulation of the Blood; by C. Bell, F. R. S. 12mo.

A Practical Treatise on the Efficacy of Blood-letting in the Epidemic Fever of Edinburgh: by B. Welsh, M. D. 8vo.

Observations on Hemeralopia, or Nocturnal Blindness, with Cases and Practical Illustrations; by A. Simpson, Surgeon. 8vo.

Cases, with Observations on the Wry Neck; by John Kerby, A. B.

Observations on the Extraction of the Teeth; by Thomas Hardy, Surgeon and Surgeon Dentist. 4to.

A Treatise on the most approved Modes of Restoring Vision by the Formation of an Artificial Pupil: by Sir William Adams. 8vo.

A Practical Inquiry into the Causes of the Frequent Failure of the Operations of Depression and Extraction of the Cataract: by the same Author.

Edinburgh Medical and Surgical Journal; No. LX.

Chemistry.

A Manual of Chemistry, containing the Principal Facts of the Science, &c. by W. T. Brande, F. R. S. 8vo.

A Description of the Process of Manufacturing Coal Gas; by F. Accum. 8vo.

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